The BULLETIN

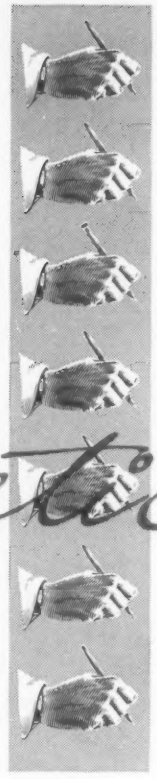
for the general treatment

of the anemias,

physicians are prescribing

'Reticulex'

(LIVER, B_{12}, IRON, AND VITAMINS, LILLY)



'Reticulex' is a combination of liver-stomach concentrate with folic acid, vitamin B_{12}, and other antianemia substances. It has been developed out of a background of over twenty years' experience in the field of anemia investigation. The combination produces prompt reticulocyte response and hemoglobin regeneration. 'Reticulex' enables the physician to obtain satisfactory results in a minimum of time with a minimum of effort. It provides the pharmacist with an additional opportunity for service and profit. Supplied in packages of 100, 500, and 5,000 pulvules. Literature on request.

Six pulvules, the recommended daily dose, will provide:	
Liver-Stomach Concentrate (as supplied in 'Lextron'* and 'Extralin'† formulas)	2,400 mg.
Ferrous Sulfate, Anhydrous	1,200 mg.
Ascorbic Acid	300 mg.
Folic Acid	2 mg.
Vitamin B_{12}	60 micrograms

*'Lextron' (Liver-Stomach Concentrate with Ferric Iron and Vitamin B Complex, Lilly)
†'Extralin' (Liver-Stomach Concentrate, Lilly)

Lilly

WE PAY HIM, BUT HE WORKS FOR YOU

ELI LILLY AND COMPANY
INDIANAPOLIS 6, INDIANA, U. S. A.

The BULLETIN

American Society of Hospital Pharmacists

SEPTEMBER—OCTOBER 1950
VOLUME 7 NUMBER 5

EDITOR

Don E. Francke
University Hospital
University of Michigan
Ann Arbor, Michigan

ASSOCIATE EDITOR

Gloria Niemeyer
American Pharmaceutical Association
2215 Constitution Ave., N.W.
Washington 7, D.C.

ASSISTANT EDITORS

Bernard E. Conley
Paul F. Parker
George L. Phillips
Evlyn Gray Scott
Sister Mary Etheldreda
Anna D. Thiel
Eddie Wolfe

ART EDITOR

Richard A. Huff

MEMBERSHIP in the American Society of Hospital Pharmacists and the American Pharmaceutical Association is open to all practicing Hospital Pharmacists. With membership is included subscriptions to THE BULLETIN of the American Society of Hospital Pharmacists and to the two *Journals* of the American Pharmaceutical Association, as well as the several services of both organizations.

ADVERTISING is accepted from those firms currently advertising in the *Journals* of the American Pharmaceutical Association. In addition, advertising for special equipment and material will be accepted. Inquiries should be sent to the Division of Hospital Pharmacy, American Pharmaceutical Association, 2215 Constitution Ave., N.W., Washington 7, D.C.

SUBSCRIPTION RATE: In the U.S. $4.50 per year (six issues), single copies 75 cents; Foreign $5 per year, single copies 85 cents.

CHANGES OF ADDRESS should be directed to the Division of Hospital Pharmacy, American Pharmaceutical Association, 2215 Constitution Ave. N.W., Washington 7, D.C.

Copyright 1950 by the American Society of Hospital Pharmacists.

The American Society of Hospital Pharmacists, an affiliate of the American Pharmaceutical Association, is a national organization devoted to the profession of hospital pharmacy and dedicated to the interests of the hospital pharmacist.

IN THIS ISSUE

A Survey and Evaluation of the Antihistamine Drugs 252

John M. Sheldon, Robert G. Lovell and Kenneth C. Matthews

The Preparation of Eye Solutions 264

Elmon L. Cataline

Fundamental Principles of Organization and Administration 273

Wilbur K. Pierpont

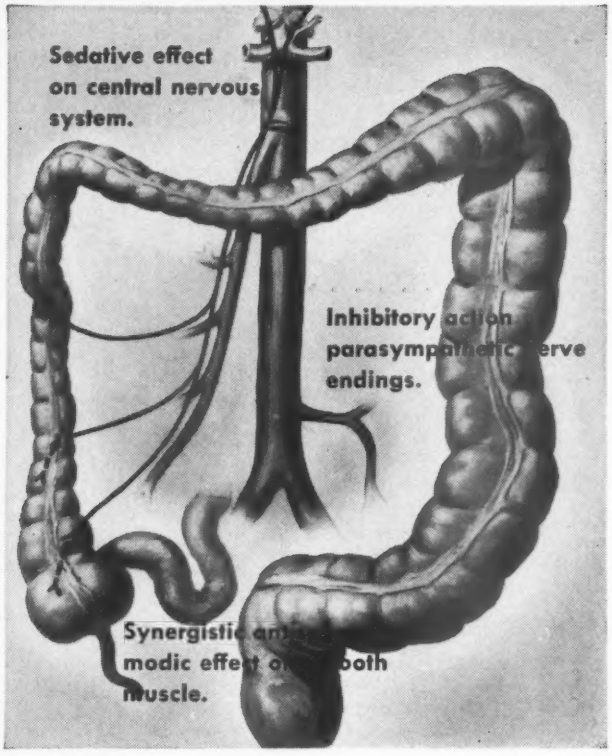
Pharmacy Department, Mt. Carmel Hospital, Columbus 270

Sister M. Florentine

Affiliated Chapters 289
As the President Sees It 288
Current Literature 290
News Items 291
Notes and Suggestions 286
Therapeutic Trends 279
Timely Drugs 282
Answers to Queries 284

Editorial 251 Letters 249 New Members 296

THE BULLETIN is published bimonthly at 1313 Ann St., Ann Arbor, Mich., by the American Society of Hospital Pharmacists in cooperation with the Division of Hospital Pharmacy of the American Pharmaceutical Association. Entered as second-class matter March 18, 1950 at the post office at Ann Arbor, Michigan. CONTRIBUTIONS of articles will be accepted if they are of general interest to those in hospital pharmacy. The editors reserve the right to revise all material sumbitted, if necessary. The American Society of Hospital Pharmacists and the American Pharmaceutical Association assume no responsibility for the statements and opinions advanced by contributors to THE BULLETIN. Views expressed in the editorials are those of the editor and do not necessarily represent the official position of either the American Society of Hospital Pharmacists or the American Pharmaceutical Association.



Trasentine-Phenobarbital

An ideal antispasmodic for prolonged use

TRASENTINE-PHENOBARBITAL is singularly free of side effects such as dryness of the mouth, pupillary dilatation and palpitation of the heart. TRASENTINE has very little cumulative effect even in large doses over a long period of time, although it is a powerful antispasmodic. Thus TRASENTINE-PHENOBARBITAL is an ideal spasmolytic agent for patients who must be treated over many months.

Prolonged illness produces an anxiety state in many patients which may noticeably retard improvement. TRASENTINE-PHENOBARBITAL relieves psychic tension and speeds recovery of these patients.

Wide use is being made of TRASENTINE-PHENOBARBITAL in daily practice to relieve pain and spastic conditions of the abdominal viscera associated with hyper-excitability of the autonomic system.

One or two tablets may be given three or four times a day. If used over long periods of time, therapy should be interrupted periodically because of the phenobarbital content.

TRASENTINE-PHENOBARBITAL—Tablets (yellow) contain 50 mg. TRASENTINE hydrochloride with 20 mg. phenobarbital.

TRASENTINE—Tablets (white) of 75 mg.; Suppositories of 100 mg.; Ampuls of 50 mg.

Ciba PHARMACEUTICAL PRODUCTS, INC., SUMMIT, NEW JERSEY

TRASENTINE® (brand of adiphenine) 2/1569M

LETTERS

Subscriptions

DEAR SIRS: Would you kindly give me your subscription rates for THE BULLETIN OF THE AMERICAN SOCIETY OF HOSPITAL PHARMACISTS. Your journal interested me exceedingly during my university work and now that I'm in practice I would like the privilege of being a subscriber. I belong to the Canadian Society of Hospital Pharmacists and hope to have the pleasure of joining your Society.

T. J. PROMHOUSE, *2nd Lieut.*
Fort Churchill Military Hospital
Fort Churchill, Manitoba, Canada

Greetings

DEAR SIRS: . . . I should like, through the medium of your Journal to send my best wishes to three American pharmacists with whom during the recent war, it was a great pleasure to work at the Hertford County Hospital. They were Emmett N. Thomas, Harold L. Jacobs, and Arthur P. Catalani.

JOHN C. H. HANSON, *M.P.S.*
Hertford County Hospital
Hertford, Herts, England

Hospital Formularies

DEAR SIRS: I have accepted a position in a hospital pharmacy recently, and my first task is to revise the formulary on hand. I would like to inquire what are some of the good hospital formularies which you might have received or would like to recommend. By reviewing some of these publications, I will have a better idea, and in this way present an improved material to the medical staff.

COLIN Y. OUWAYE

465 N. King Street
Honolulu, T.H.

Editor's Note: **Hospital pharmacists will be interested to note that a number of the more recently published hospital formularies are available on loan from the library at the headquarters of the American Pharmaceutical Association. Some of the formularies available include the following: *Indiana University Medical Center Hospital Formulary*, Indianapolis, Ind., 1947; *Handbook and Formulary of the University Hospitals*, State University of Iowa, Second Edition, Iowa City, 1946; *Formulary of the University Hospital*, Ann Arbor, Mich., Second Edition, 1947; *Formulary and Handbook of the Johns Hopkins Hospital*, Baltimore, 1942; *The Duke Hospital Formulary*, Durham, N.C., 1949; *Formulary of Beth Israel Hospital*, New York City, 1950; *Evangelical Deaconess Hospital Formulary*, Detroit, Mich., 1949; *Formulary of the New York University Clinic*, New York University Medical Group, New York City, 1949; *Lynn Hospital Formulary*, Lynn, Mass., Second Edition, 1949; *Baltimore City Hospitals Formulary*, Baltimore, 1950.**

Internships

SIRS: I am interested in making a career of hospital pharmacy. In the June issue of the *American Professional Pharmacist,* I noted an article stating that I might acquire information regarding positions in hospital pharmacy through you. Could you please send me the current listings of openings in hospital pharmacy.

In the article there is also a statement concerning two types of internships available in hospitals. The type which is listed as "a postgraduate, non-academic full-time position at practical hospital pharmacy work" is of interest to me. The article states that further information on this type of internship may also be obtained from your office.

Thank you for any information and help you may give me.

ERVIN DINER

2451 South 20th St.
Philadelphia, Pa.

Affiliate

SIRS: Thank you for your good letter of May 17. We are happy to learn that the Hospital Pharmacists of the Puget Sound Area is now an affiliate organization of the American Society of Hospital Pharmacists.

Interest in our local organization seems to be growing which is evidenced by the fact that we have one new member and I am enclosing his applications for membership in the American Pharmaceutical Association and in the American Society of Hospital Pharmacists together with his personal checks for the first year's dues.

ELMER M. PLEIN, *Secretary*
Hospital Pharmacists of the
Puget Sound Area
Seattle 5, Washington

DEAR SIRS: I read with considerable interest your article on "Propylene Glycol" which appeared in the January–February, 1950 issue of THE BULLETIN OF THE AMERICAN SOCIETY OF HOSPITAL PHARMACISTS.

If available I would greatly appreciate receiving from you a reprint of this article.

EUGENE L. COHEN, *Director*
Wyanel Laboratories
Philadelphia 22, Pa.

Chloromycetin®

now available in ample supply to meet all demands

The supply of CHLOROMYCETIN is at last catching up with the demand.

Chloromycetin is unique—the first and only antibiotic to be synthesized and produced on a practical scale. It is a pure crystalline compound. Its structure has been accurately determined. Its composition has been unvarying since its first introduction. It is free of extraneous substances that might cause side reactions.

Because it is clinically effective in a wide range of infectious diseases and because it is so well tolerated, physicians are depending more and more on CHLOROMYCETIN.

Packaging: CHLOROMYCETIN (chloramphenicol, Parke-Davis) is supplied in Kapseals® of 250 mg., and in capsules of 50 mg.

PARKE, DAVIS & COMPANY

EDITORIAL

Hospital Pharmacies and Outside Prescriptions

by Don E. Francke

That hospital pharmacies should fill only prescriptions originating from within the hospital is one of the basic policies adopted by the American Society of Hospital Pharmacists and approved by the American Pharmaceutical Association. This principle is succinctly and forthrightly stated in the elaboration of the *Minimum Standard for Pharmacies in Hospitals* from which the following is a quotation:

> "Only those orders and prescriptions originating within the hospital should be filled by the hospital pharmacy. Prescriptions written by physicians who are not members of the hospital staff should not be filled by the hospital pharmacy."

Fortunately, the vast majority of hospital pharmacies follow this policy and there are only relatively few which do not. But this principle is an important one which needs emphasis.

Usually, it is not the pharmacist, but a misguided administrator who initiates the policy of filling prescriptions for the general public. When such a situation arises it is the duty of the pharmacist to call the administrator's attention to certain basic ethical and professional principles for the operation of pharmacies in hospitals. For clear statements on two of these principles, the administrator may be referred to the *Transactions of the American Hospital Association* **39**:154, 1937 where he will find the following:

> "The hospital pharmacy should offer its services only to patients and employees of the hospital and to those directly connected with the institution of which it is a part; as for example, health service to students."
>
> ". . . I do not believe that in a hospital there is any real good reason for establishing a pharmacy except for the wants of the patient in dispensing drugs and sick room supplies. The hospital pharmacist should handle such items as syringes, sick room supplies, toilet articles, and similar products which will be required by the patients themselves. They should not, however, carry patent and proprietary medicines for general sale. If the hospital is contemplating offering a service to the patients and personnel consisting of food, drinks, and other restaurant items, this should probably come under the dietary department, being separate and distinct from the pharmacy."

Hospital pharmacies were established to serve patients who come to the hospital to be treated by physicians on the hospital staff. These patients may come as inpatients or outpatients. Retail pharmacies were established with a prime function of serving the public health needs, as pertains to pharmacy, of the people of the community as a whole. Therefore, it is obvious that if hospital pharmacies begin reaching out into the community and accepting prescriptions from the general public, the very foundation on which retail pharmacies exist will be weakened.

There is no good reason why hospital pharmacies should adopt the policy of filling prescriptions for outside patients. It is a dangerous practice which ignores not only the total public welfare, but also the basic rights, privileges, and welfare of the practicing retail pharmacist. As a fellow professional individual, and as a citizen and a taxpayer of his community, the retail pharmacist has earned the privilege of serving the community at large. The pharmacist in any general hospital with fifty or more beds can justify his position without resorting to filling outside prescriptions. The excuse of supplying additional revenue to the hospital so as to help balance its budget does not alter the principle upon which this policy, so clearly stated by the American Society of Hospital Pharmacists, is based.

As a corollary to this policy, one may also say that "retail pharmacies should fill prescriptions for the general public." And while this may appear as a surprising statement, there are innumerable instances where the public cannot get prescriptions, particularly those which require compounding, filled in retail pharmacies. Some retail pharmacists state they will not fill such prescriptions because "it doesn't pay" or "it is too much bother." But it does pay—particularly in interprofessional and public relationships. Imagine the reaction of the physician who wrote the prescription and of the patient who needs assistance when he hears statements of this kind. The compounding and dispensing of prescriptions is the function which forms the basis for the existence of retail pharmacies. This function is the foundation for the legal licensure of pharmacists and pharmacies. It is a basic responsibility which cannot be evaded.

The expansion of medical care through voluntary health insurance is going to increase enormously the volume of pharmaceuticals dispensed through hospital pharmacies. This makes it all the more imperative that any trend toward the practice of hospital pharmacies filling outside prescriptions be arrested immediately.

A Survey and Evaluation of the

ANTIHISTAMINE DRUGS

By JOHN M. SHELDON, ROBERT G. LOVELL, *and* KENNETH C. MATTHEWS

THE RECENT introduction of the antihistaminic compounds, a group of related chemicals which provide remarkable symtomatic relief from numerous allergic and other organic disorders, has brought into focus a new therapeutic medium in the treatment of disease. The enthusiastic exploitation of these compounds carried on by a number of pharmaceutical houses, and the great interest shown by physicians and the public have resulted in widespread and universal use of the antihistaminics, even though six years ago they were still only in the hands of research workers, and most physicians and pharmacists had never heard of them. Because of their general use and clinical effects, it is worthwhile to consider the several dozen compounds which are now available on the market. While the many different proprietary antihistaminics, each claiming to be "the best," may annoy the busy physician, and perplex the over-worked pharmacist, there is, in our opinion, justification for the several kinds of histamine antagonists. It is our purpose to show how their molecular structure may influence clinical effect, and outline a rational program for their administration.

John M. Sheldon, M.D., Robert G. Lovell, M.D. and Kenneth C. Matthews, M.D. are respectively Professor of Medicine, and Instructors in Medicine at the University Hospital, University of Michigan, Ann Arbor.

HISTORICAL BACKGROUND

The field of allergy as a disease specialty is relatively new, but research has been so extensive, it is possible only to touch upon the high points of the reported work which has been done on the subject of histamine and its place in allergic reactions.

In 1908, Von Pirquet [1] pointed out the close relationship between clinical allergy and anaphylaxis. It was Dale and Laidlaw,[2] two years later, who demonstrated that histamine, which had been isolated from ergot,[3] when injected into animals presented a reaction closely resembling the picture of anaphylactic shock. It was their opinion that histamine might be released during anaphylaxis. Two important steps were made in 1927. Sir Thomas Lewis [4] advanced his now famous work on the triple response and the histamine-like, or "H" substance. Dale [5] in the same year suggested that histamine held in unavailable form is released from the animal tissue cells when stimulated by the reaction between antigen and antibody. When histamine was demonstrated by

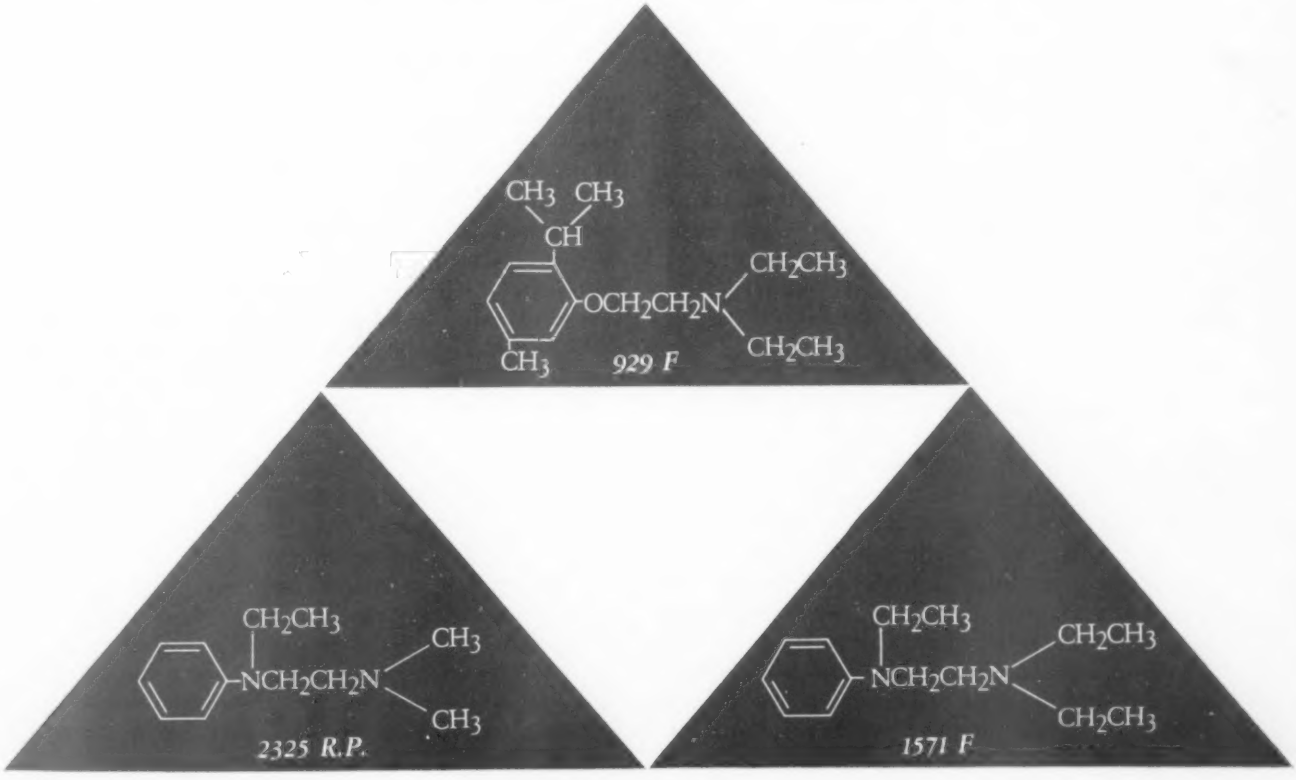
Best to be present normally in animal tissues,[6] the whole concept of present-day thinking about the allergic mechanism began to take shape, particularly when it was shown that following anaphylactic shock, the histamine content in the lungs of guinea pigs and the livers of dogs was definitely reduced.[7] Certain features of anaphylactic shock cannot be attributed to histamine release. The increased coaguability of the blood, which we now feel is due to the release of heparin, and the changes in blood count and sedimentation rate are examples. The place of the pituitary-adrenal axis in such phenomena may become more apparent later on. For the moment our concern is with efforts to inhibit or neutralize the effect of released histamine on the tissues of sensitized animals.

By 1932, some 165 various substances and technics had been employed in non-specific "antianaphylaxis" therapy.[8] Such compounds as barium salts, atropine, barbiturates, ether, benzene, heparin and amino acids were a few of the materials tried. Each proved too toxic, or relatively ineffective. Desensitization with histamine, by repeated small, increasingly strong injections was tried. This method was not successful in general, although it still is used in treating the histamine type of cephalalgia, or Horton's headaches.[9] Histamine injections when tried as a desensitizing measure, failed to produce any antibodies and therefore, it was felt that a histamine conjugate might stimulate production of antibodies. By an azo linkage, histamine was coupled to despeciated horse serum globulin, and injections of this histamine-azoprotein were given to allergic patients.[10] While early results showed promise, this method did not stand the test of time, and was not the long-sought answer to controlling the wayward action of histamine.

An enzyme with the ability to neutralize action of histamine, known as histaminase was discovered in 1929 by Best,[11] and when mixed together *in vitro* histaminase was shown to neutralize histamine. *In vivo* effectiveness, however, is disappointing, and in spite of large amounts of histaminase, anaphylaxis and allergic manifestations appear to go unchecked in living animals.[12]

In 1937, Edlbacher and his colleagues [13] working with amino acids showed that arginine, cysteine and histidine were effective in preventing the contraction of guinea pig intestine resulting from exposure to histamine. These findings were supported by others [14] but the high toxicity of the amino acids prevented their clinical use. Furthermore, not all the symptoms produced by histamine could be prevented by application of the amino acids.

The real precursers of the present antihistaminic drugs were developed in 1933, when Fourneau and Bovet [15] showed that some of the phenolic ethers had the ability to prevent the action of histamine not only *in vitro,* but also in



living animals. The most potent phenolic ether compound was 929F, which had antihistaminic action but was considerably toxic. For this reason, Staub [16] investigated another of the compounds, 1571F, which contained the ethylenediamine radical. This substance also was found to be too toxic to use therapeutically, but is of importance because of the ethylenediamine radical. Aminophylline, which is a mixture of ethylenediamine and theophylline, was thought at first to be so effective in relief of bronchial asthma because of the theophylline which was made more soluble and potentiated by the ethylenediamine. But ethylenediamine itself appears to have a definite therapeutic action, since it is found in nearly every one of the present day antihistamine compounds.

Further developments took place in 1942, when Halpern [17] reported the effects of compounds which had been developed by Mosnier at the Rhone-Poulenc Society of Chemical Manufacturing. Compound 2325 RP is strikingly similar to Staub's 1571F, with the exception of the substitution of a dimethyl for a diethyl group. Compound 2339 RP, or Antergan, differs from 2325 RP only in the replacement of the ethyl group by a benzyl group. Antergan was found to be effective in allergic disorders and was used clinically in Europe in 1942. Bovet, et al [18] introduced another compound, Neo-Antergan which is an ethylenediamine derivative, and is less toxic than Antergan.

Three years later, in 1945, Loew and his associates [19] reported in the United States the development of another compound, Benadryl, which was more potent as an antihistaminic than compounds 929F and 1571 F.

Mayer and his workers [20] a few months later reported the effectiveness of Pyribenzamine, which is seen to differ from Neo-Antergan by removal of the methoxy group, and from Antergan through substitution of the pyridyl with a phenyl ring.

CLINICAL USES

Because of the antihistaminic and antianaphylactic properties of the histamine antagonists, their use in allergic conditions is widespread. As will be pointed out later, there is in our opinion no one antihistaminic compound which should be used in preference to the others for a particular allergic condition. A specific antihistaminic may give dramatic relief of all signs and symptoms of urticaria in one patient, without side-effects, while in another patient with hives having the same etiology, the same antihistaminic will provide little benefit. Or the side-reactions produced may be so severe that discontinuation of the drug is necessary. The trial of another antihistaminic in this second patient may bring gratifying relief. There apparently is an individual patient-response to the antihistaminic drugs. "What is one man's meat is another's poison" holds true with this group. Furthermore, there is no relationship between degree of relief obtained and severity of side reaction. It is possible for a patient to have complete deliverance from his allergic symptoms, but be compelled to discontinue the drug because of its severe sedative or toxic effect. Sometimes, by continuation of the drug the patient will overcome the unpleasant side reactions and will feel asymptomatic. But this never should be attempted unless the symptoms are mild. Also, there are cases in which tolerance never does develop, even after a number of weeks of trial.

The antihistaminic drugs as a group, in general, seem to exert a maximum amount of effectiveness for the same types of allergic manifestation. *Vasomotor rhinitis,* including hay fever and allergic rhinitis seems to be relieved in from 60 to 80 per cent of cases treated.[21] This number becomes even higher when used in combination with hyposensitization to specific allergens.[22]

Urticaria, either acute or chronic responds in a gratifying manner to antihistaminic therapy. Prompt relief of itching usually is followed by partial or complete remission. Loveless reports subjective improvement in 80 per cent of such patients.[21] Larger doses are required for angioneurotic edema, and sometimes this manifestation does not respond well in our experience.

Bronchial Asthma particularly when of moderate or severe degree responds in a disappointing manner to antihistamine treatment. From 0 to 50 per cent of cases may benefit,[21] and the histamine antagonists may prevent mild attacks of seasonal or periodic asthma. Caution should be used in giving these drugs to severe asthmatics, particularly when copious amounts of sputum are not being coughed up. The atropine-like effect which is obtained from every antihistaminic may produce further drying of the bronchial secretions with resulting thickening and formation of bronchial plugs. This, of course, is the beginning of atelectasis and serious complications in bronchial asthma.

Serum sickness and *drug reactions* are helped greatly by the antihistaminics, particularly the delayed type of serum sickness seen following a hypersensitivity reaction to penicillin. It should be stressed that the sooner antihistamine treatment is begun after manifestations of serum sickness appear, the better will be the relief obtained. For this reason, we advocate the use of intravenous antihistaminics when starting to treat

serum sickness reactions since in this form the drug becomes immediately available to the patient.

Allergic shock of the type which follows insect bites or bee stings may be allayed by giving adequate intravenous antihistaminics, (50-100 mg. Benadryl or 25-50 mg. Decapryn in adults, followed by oral medication).

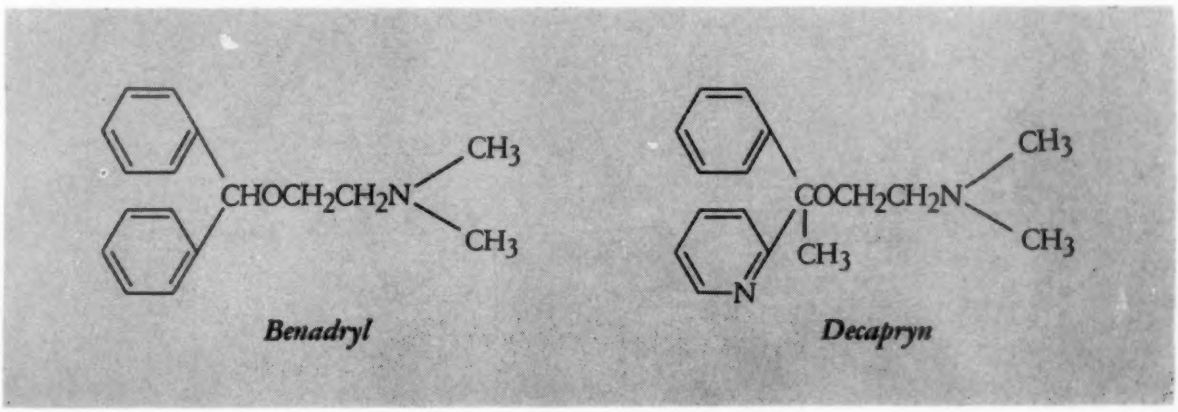
Physical allergy, whose manifestations are brought on by exposure to cold, light or some other stimulus, may benefit from these drugs. *Allergic headache* and *migraine,* may in some cases be helped by antihistaminics, but results universally are not so favorable as in hay fever or urticaria. *Gastro-intestinal allergy* in some cases may be benefitted by this group of drugs.

The histamine antagonists have a real place in the treatment of *atopic eczema,* both in the adult and in the child. While clearing of the condition is not always complete, itching frequently is relieved, allowing the skin to heal without repeated trauma from scratching.

Contact dermatitis, in our opinion is influenced favorably from use of the antihistaminics in that they modify the itching, and may attenuate the spread of the lesions. Although

GROUP I

GENERIC AND CHEMICAL NAME	TRADE NAME AND COMPANY	DOSAGE FORMS
DIPHENHYDRAMINE (HYDROCHLORIDE) β—dimethylamino-ethylbenzohydryl ether	Benadryl (Parke-Davis & Co.)	Capsules 25 mg., 50 mg. Enteric-coated tablet 50 mg. Injection 10 mg./cc. Elixir 10 mg./4 cc.
	Benylin Expectorant (P.D. & Co.)	Expectorant Each oz. contains 80 mg. + 0.72 Gm. ammonium chloride + 0.32 Gm. sodium citrate + 120 mg. chloroform + 6 mg. menthol.
	Caladryl (P.D. & Co.)	Lotion 1% with calamine
	Hydryllin (G. D. Searle)	Tablet 25 mg. + 100 mg. aminophylline
	Hydryllin Compound (Searle)	Tablet 25 mg. + 100 mg. aminophylline + 25 mg. racephedrine hydrochloride Liquid 6.25 mg./4 cc. + 25 mg. aminophylline + 15 mg. potassium iodide + 8 mg. chloroform Elixir 12.5 mg./4 cc. + 50 mg. aminophylline
DIMENHYDRINATE Diphenhydramine 8-chlorotheophyllinate	Dramamine (G. D. Searle)	Tablet 50 mg. Liquid 12.5 mg./4 cc.
DOXYLAMINE (SUCCINATE) α-dimethylamino-ethoxy-α-2-pyridyl-ethylbenzene	Decapryn (Wm. S. Merrell)	Tablets 12.5 mg., 25 mg. Liquid 1.05 mg./cc.
	Decapryn Compound (Merrell)	Tablet 6 mg. + 230 mg. aspirin + 150 mg. acetophenetidin + 30 mg. caffeine
	Decapryn Minergic (Merrell)	Liquid 6 mg./5 cc. + 300 mg. sodium salicylate + 15 mg. caffeine Injection 5 mg./cc.
	Mercodol with Decapryn (Merrell)	Liquid 36 mg./30 cc. + 10 mg. dihydrocodeinone bitartrate + 100 mg. Nethamine + 1.2 Gm. sodium citrate
	Nethaprin (Merrell)	Liquid 6 mg./5 cc. + 25 mg. Nethamine + 60 mg. theophylline aminoisobutanol



Benadryl *Decapryn*

topical application for its anesthetic effect is advocated, we feel that, in general, systemic administration is more beneficial. In *itching conditions of the skin* which are not allergic in origin, the antihistaminics still may be helpful. In *measles* and *chickenpox* they are great factors in promoting relief from pruritus. If Benadryl or Decapryn is used, the drowsiness frequently encountered may act as a helpful sedative in keeping the patient quiet.

In *ophthalmic conditions,* such as vernal conjunctivitis and hypersensitivity reactions to ophthalmic medication, antihistaminic eye drops may be helpful in giving symptomatic relief.

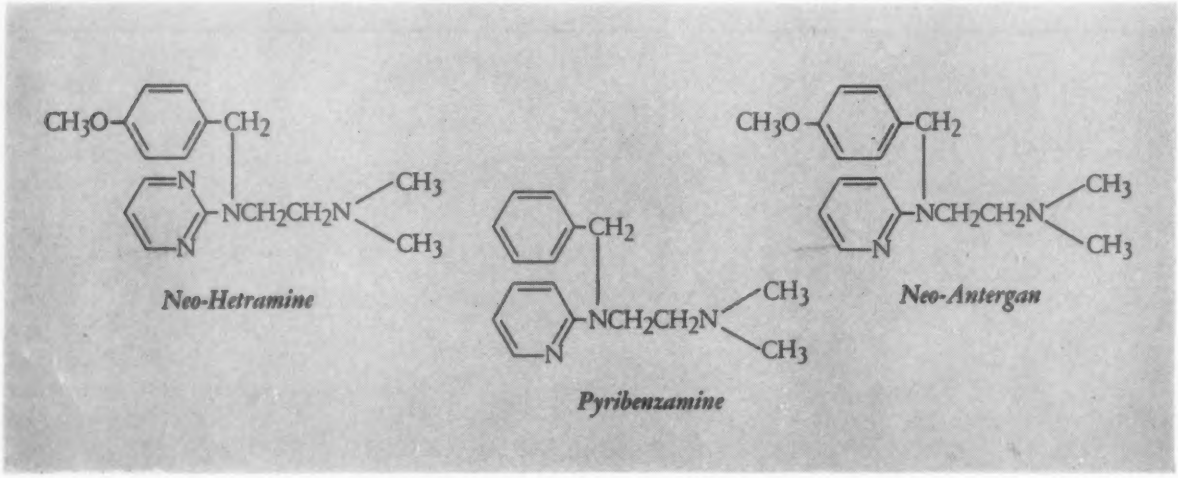
Parkinsonism often is greatly helped [23] by long-time administration of antihistaminics. The tremor is lessened, and the patients find that they can feed themselves, write, and perform with greater accuracy feats previously impossible.

The place of the antihistaminics in the *common cold* is as yet undecided. Because of the increased concentration of histamine in the nasal mucosal secretions in patients developing an upper respiratory infection, the antihistaminics were given in an attempt to prevent the subsequent course of the infection. Everyone is familiar with the exploitation of these compounds which followed and the high pressure advertising which has accompanied the over-the-counter sale of "cold compounds." Carefully controlled work [24] has shown recently that there may be very little change in the course of an upper respiratory infection treated with the antihistaminics, but many people feel that there is a drying effect which relieves the rhinitis, and possibly some helpful influence on nasal stuffiness. *Cough,* whether it is on an allergic or non-allergic basis, may be benefitted by histamine antagonists, and this should be kept in mind in treating chronic cough where narcotic medication is undesirable.

PROPERTIES AND ACTION OF ANTIHISTAMINICS

The early theory that histamine was neutralized or destroyed by the antihistaminic drugs no longer is felt to be the explanation for their mode of action. If a guinea-pig is protected by an adequate dose of antihistaminic, and then subjected to an amount of histamine which kills a control animal, the protected guinea-pig does not die at once, but in 48 hours death may occur due to a perforated gastric ulcer which in turn has been caused by the prolonged action of histamine. Thus, histamine has not been neutralized. Instead, it now is felt that the antihistaminic competes with the cell receptors of the tissue of the organ system involved, the so-called "shock organ" of the animal. By attaching itself or covering the cell receptors in some way, the antihistaminic prevents histamine from asserting its influence on the cell, and the resulting cell response which produces the symptoms of allergy does not take place. As long as this blocking effect is maintained, histamine appears to be unable to act.

In addition to the blocking effect, the antihistaminic compounds have several other pharmacological actions, which apparently have nothing to do with their histamine antagonism. In the first place, they have a definite sedative effect in a good many patients, and certain of the compounds, Benadryl and Decapryn seem to be more prone to produce sedation than some of the others. A reason for this will be proposed when the molecular structure of these two compounds is discussed. Second, there is a local anesthetic effect produced by this group of drugs, which although short-lived is definite, and in the case of Neo-Antergan, it is three times as potent a local anesthetic as procaine when injected into the skin of guinea-pigs.[25] Third, there is an atropine-like effect inherent to all antihistamine com-



GENERIC AND CHEMICAL NAME	TRADE NAME AND COMPANY	DOSAGE FORMS
PYRANISAMINE (MALEATE) N,N-dimethyl-N′-*p*-methoxybenzyl-N′-2-pyridylethylenediamine	Paraminyl Maleate (Buffington)	Tablet 50 mg.
	Dolopar (Buffington)	Tablet 32 mg. + 225 mg. aspirin + 162 mg. acetophenetidin + 15 mg. caffeine + 1 minim tinct. gelsemium
	Pyranisamine Maleate (Otis Clapp)	Tablet 25 mg.
	Pyramal (Columbus)	Tablet 50 mg.
	Pyrasal (Columbus)	Tablet 25 mg. + 325 mg. aspirin + 16 mg. caffeine
	Pyranisamine Maleate (Direct Sales)	Tablets 25 mg., 50 mg.
	Neo-Antergan (Merck)	Tablets 25 mg., 50 mg.
	Pyranisamine Maleate (Premo)	Tablet 50 mg.
	Neo Cafotan (Premo)	Tablet 16 mg. + 30 mg. caffeine + 150 mg. acetophenetidin + 210 mg. aspirin
	Neomine (Professional Drug Service)	Tablet 25 mg.
	Acetomine (P.D.S.)	Tablet 25 mg. + 210 mg. aspirin + 150 mg. acetophenetidin + 30 mg. caffeine
	Pyranisamine Maleate (Rexall)	Tablets 25 mg., 50 mg.
	Monhiston with APC (Rexall)	Tablet 25 mg. + 150 mg. acetophenetidin + 210 mg. aspirin + 30 mg. caffeine
	Thylogen (Wm. H. Rorer)	Tablets 25 mg., 50 mg.
	Pyranisamine Maleate (Smith-Dorsey)	Tablet 50 mg.
	P.P.A. Capsule (Smith-Dorsey)	Capsule 25 mg. + 60 mg. acetophenetidin + 320 mg. aspirin
	Pye Capsule (Smith Dorsey)	Capsule 50 mg. + 10 mg. ephedrine sulfate
	Antopic Cream (Smith-Dorsey)	Ointment 5% + calamine + zinc oxide + benzocaine
	Renstamine (R. J. Strasenburgh)	Tablet 25 mg. + 2.5 mg. amphetamine phosphate
		Liquid 10 mg./5 cc. + 1 mg. amphetamine phosphate
	Pyra-Maleate (Van Pelt & Brown)	Tablets 25 mg., 50 mg.
	Dexapyramine (Vitamix)	Capsule 25 mg. + 2 mg. dextro-amphetamine Hcl. + 150 mg. aspirin + 15 mg. caffeine + 150 mg. acetophenetidin
		Injection 25 mg./cc. + 2 mg. dextro-amphetamine Hcl.
	Histacin (Walker Vitamin)	Capsule 20 mg. + 180 mg. aspirin + 120 mg. acetophenetidin + 60 mg. caffeine + 30 mg. ascorbic acid
	Glybrom (E. L. Patch)	Tablet 50 mg. (as the 8-bromtheophyllinate)
THONZYLAMINE (HYDROCHLORIDE) N,N-dimethyl-N′-2-pyrimidyl-N′-*p*-methoxybenzylethylenediamine	Neo-Hetramine (Wyeth, Inc.)	Tablets 25 mg., 50 mg., 100 mg. Liquid 6.25 mg./cc. Ointment 2%
TRIPELENNAMINE (HYDROCHLORIDE) N,N-dimethyl-N′-benzyl-N′-2-pyridylethylenediamine	Pyribenzamine (Ciba)	Tablet 50 mg. Enteric-coated tablet 50 mg. Elixir 7.5 mg. (citrate)/cc. Ointment 2% (petrolatum base) Ointment 2% (washable base) Tablet 25 mg. + 12 mg. ephedrine sulphate Expectorant 30 mg. (citrate)/4 cc.. + 10 mg. ephedrine sulfate + 80 mg. ammonium chloride Nasal Solution 0.5% Injection 25 mg./cc. Nebulizer 0.5%

pounds which must be taken into consideration, as has been mentioned when considering their use in bronchial asthma. This atropine action is beneficial in rhinitis, but may be the explanation for some patients complaining of dry mouth and lack of tears in the eyes. Finally, there is central nervous system influence which is helpful in Parkinsonism, but which may result in unwanted stimulation. Hyperactivity in children taking these drugs should be watched for, and the medication discontinued if this is observed. Mental confusion, personality changes and dizziness are sometimes reported by patients taking one of these drugs. The beneficial use of Dramamine in motion sickness may be attributed to central nervous system effect with specific action on the vestibular apparatus. The antihistaminics do not appear to inhibit the gastric secretion or influence the transient hypotension produced by histamine. They do not influence the mydriasis which histamine produces. They may potentiate the pressor action of epinephrine hydrochloride. It is felt that when used clinically in combination with aminophylline, an antihistaminic gives a synergistic action, being of more value combined than when either compound is used alone.

SIDE REACTIONS TO THE ANTIHISTAMINIC COMPOUNDS

Although some of the side reactions to antihistaminics have already been mentioned, it might be well to list the signs and symptoms sometimes resulting from their administration. As has been pointed out, it cannot be said ahead of time which patient will experience side reactions, and the choice of the best antihistaminic compound for a patient therefore cannot be made until several have been tried. Drowsiness certainly is the most common reaction experienced. This may be mild and temporary, disappearing after one to five doses of the medication or may be severe and persistant as long as the drug is given. Coffee, caffeine, or amphetamine may be used to counteract this. Gastrointestinal upset is also commonly encountered. Nausea, vomiting, diarrhea, abdominal cramping or constipation may occur. Dryness of the mouth, vertigo, visual blurring, and personality changes may be observed. The reactions so far mentioned account for at least 90 per cent of all toxic side effects seen. Fatigue, insomnia, nervousness, perspiration, early menses, headache, paresthesia, extra-systoles, urinary frequency and chilly sensation have been reported. Dermatitis medicamentosa and allergy to both the filler in the tablet as well as to the antihistaminic itself have been observed, but these cases are rare. Agranulocytosis also is known to have occurred.

MOLECULAR STRUCTURE AND CLINICAL EFFECT

As there are almost two dozen of the antihistaminic compounds on the market today, some method should be adopted for their rational clinical trial. It is not the usual finding to have a patient get the most relief from the first group that he tries; in fact, only after using several is it certain that the best one is being taken and that maximum relief is obtained. It would be too bad to maintain a patient on a certain of the drugs providing him with 60 to 80 per cent relief, if by switching to another of the group, he could have been given 100 per cent relief.

Fortunately, there is a systematic approach to this problem. The outstanding work of Drs. Seyler and Marsh at the University of Louisville has provided us with a practical way to try out the antihistaminic compounds on an individual patient. They have divided the compounds into four groups, based upon their molecular structure. This classification is theirs and credit for it should go to them.

In accord with their work, we can point to the structural formula which is seen in almost all antihistamine compounds:

$$R\text{–}CH_2CH_2N\begin{matrix}CH_3\\CH_3\end{matrix}$$

"R" in this compound represents any slightly basic, large radical which makes up three-fourths of the molecular weight of the antihistaminic. It is the dimethylamino portion, $N(CH_3)_2$ which is primarily responsible for blocking the action of histamine. Alteration of the carbon atoms of the ethylene group has not been beneficial, and in most antihistaminics the dimethylamino ethylene portion is maintained.

It has been possible to change the linkage between the "R" portion of the molecule and the ethylene radical as is below:

EFFECTS OF ALTERING LINKAGE OF ANTIHISTAMINE DRUGS

TABLE I

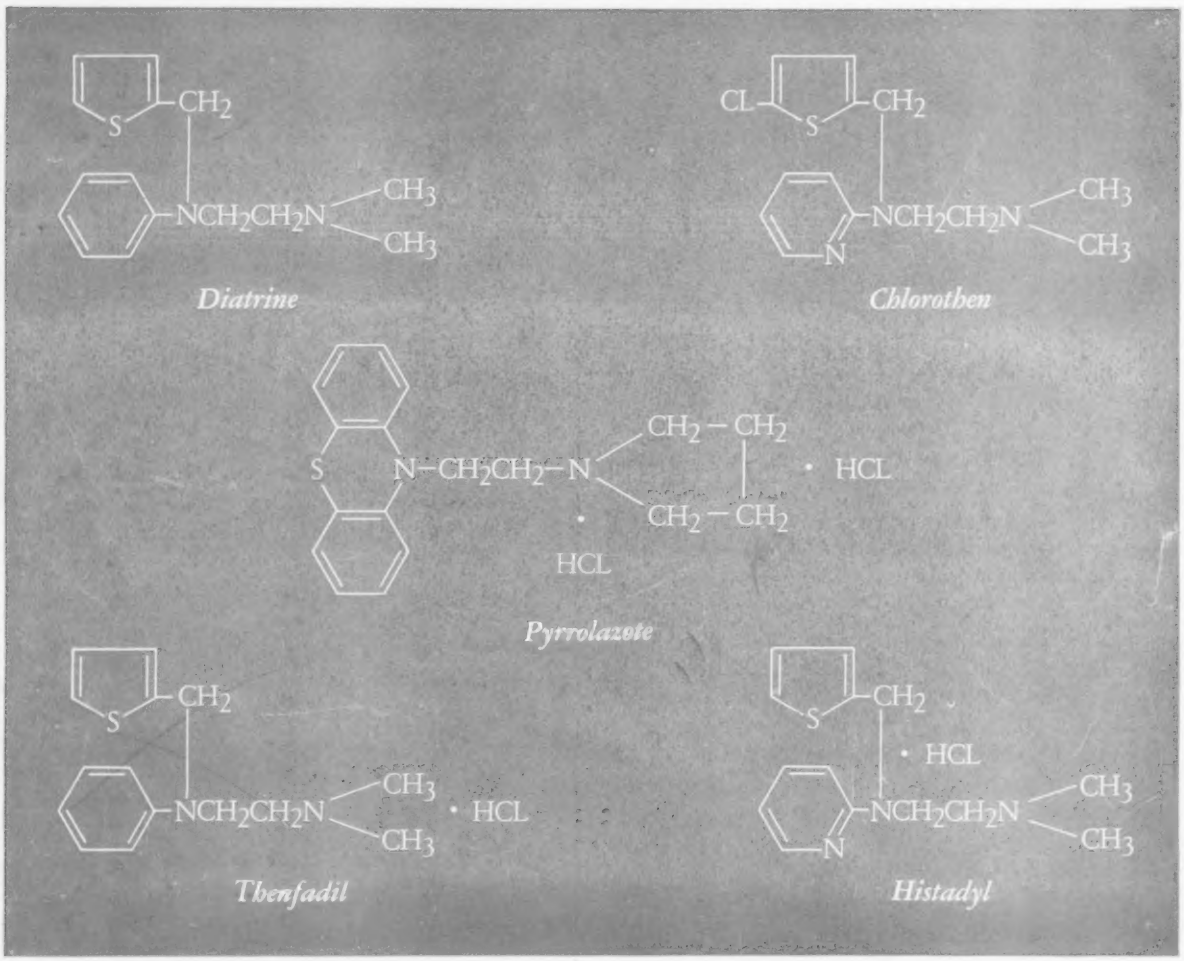
Group	Formula	Activity	Toxicity	Side Reaction (Drowsiness)
I	$R\text{–}O\text{–}CH_2CH_2N\begin{matrix}CH_3\\CH_3\end{matrix}$	2	1	1
II	$R\text{–}N\text{–}CH_2CH_2N\begin{matrix}CH_3\\CH_3\end{matrix}$	1	2	2
III	$R\text{–}CH_2CH_2CH_2N\begin{matrix}CH_3\\CH_3\end{matrix}$	3	3	3
IV	Miscellaneous	4	4	4

(After Seyler & Marsh)

GENERIC AND CHEMICAL NAME	TRADE NAME AND COMPANY	DOSAGE FORMS
N,N-dimethyl-N′-2-pyridyl-N′-5-chloro-2-thenylethylenediamine	Fernoxydyne Compound (George A. Breon)	Tablet 25 mg. + 320 mg. acetophenetidin + 32 mg. caffeine
	Tagathen (Lederle)	Tablet 25 mg.
	Chlorothen (Whittier)	Tablet 25 mg.
	Caubren Compound (Whittier)	Tablet 25 mg. + 320 mg. acetophenetidin + 32. mg caffeine
N,N-dimethyl-N′-phenyl-N′- (2-thienyl)-ethylenediamine	Diatrin (Wm. R. Warner)	Tablet 50 mg.
THENYLPYRAMINE (HYDROCHLORIDE) N,N-dimethyl-N′-2-pyridyl-N′- (2-thenyl)-ethylenediamine	Thenylene (Abbott)	Tablets 25 mg., 50 mg., 100 mg.
	Thenelene and Desoxyn (Abbott)	Tablet 50 mg. + 2.5 mg. desoxyephedrine Hcl.
	Thenylene Cream (Abbott)	Ointment 2%
	Thenylene-APC (Abbott)	Capsule 25 mg. + 230 mg. aspirin + 150 mg. acetophenetidin + 30 mg. caffeine
	Thenylfred (Abbott)	Tablet 50 mg. + 25 mg. ephedrine Hcl.
	Methapyrilene hydrochloride (Blue Line Chemical)	Tablet 50 mg.
	Pentryl (Chilcott)	Tablet 50 mg. + 16 mg. ephedrine Hcl. + 16 mg. pentobarbital sodium
		Enteric-coated tablet 50 mg. + 16 mg. ephedrine Hcl. + 16 mg. pentobarbital sodium
	Histafed (Cole Chemical)	Capsule 25 mg. + 8 mg. ephedrine Hcl. + 10 mg. ascorbic acid
	Histadyl (Eli Lilly)	Capsule 25 mg., 50 mg. 100 mg.
		Injection 20 mg./cc.
		Ointment 2%
		Ointment 2% + 0.5% Surfacaine
		Enteric-coated tablet 50 mg.
		Ophthalmic ointment 0.5%
		Tablet 25 mg. + 225 mg. aspirin + 150 mg. acetophenetidin + 30 mg. caffeine
		Tablet 25 mg. + 8 mg. ephedrine Hcl.
		Tablet 50 mg. + 16 mg. ephedrineHcl.
		Solution 0.5%
		Solution 4 mg./cc.
		Solution 80 mg./oz. + 65 mg. codeine + 30 mg. ephedrine
		Lotion 2% + 0.5% Surfacaine
	Pyrathyn (Flint, Eaton)	Capsule 25 mg. + 12.5 mg. cyclopentamine
	Capathyn (Flint, Eaton)	Capsule 50 mg.
	Pyracol (Flint, Eaton)	Tablet 20 mg. + 230 mg. aspirin + 150 mg. acetophenetidin + 30 mg. caffeine
	Methoxylene (McNeil)	Liquid 160 mg./oz. + 778 mg. ammonium chloride + 648 mg. citric acid + 130 mg. chloroform + 6 mg. menthol
	Corenil (McNeil)	Tablet 50 mg. + 2.5 mg. racemic desoxyephedrine Hcl.
	Semikon (Massengill)	25 mg. + 7.5 mg. extract belladonna + 1.25 mg. racemic desoxyephedrine Hcl.
	Dasikon (Massengill)	Tablet 50 mg.
		Enteric-coated tablet 50 mg. and 100 mg.
	Sedacof Expectorant (Massengill)	Capsule 25 mg. + 30 mg. caffeine + 200 mg. aspirin + 120 mg. acetophenetidin + 0.06 mg. atropine sulfate
	Cohistine (Pitman-Moore)	Solution 15 mg./5 cc. + 200 mg. sodium citrate + 100 mg. ammonium chloride + 10 mg. ephedrine Hcl. + 1 mg. antimony potassium tartrate
	Proketal Compound (Sharp & Dohme)	Tablet 25 mg. + 225 mg. aspirin + 160 mg. acetophenetidin + 1 mg. dextro-amphetamine sulfate
		Capsule 25 mg. + 230 mg. aspirin + 150 mg. acetophenetidin + 30 mg. caffeine
		Capsule 25 mg. + 230 mg. aspirin + 150 mg. acetophenetidin + 30 mg. caffeine + 15 mg. codeine phosphate
	Nuclon (Smith, Kline & French)	Capsule 37.5 mg. thenylpyramine fumarate equiv. to 25 mg. of the Hcl.) + 1.25 mg. dextro-amphetamine sulfate + 150 mg. aspirin

GROUP II—B— (CONTINUED)

GENERIC AND CHEMICAL NAME	TRADE NAME AND COMPANY	DOSAGE FORMS
PYRATHIAZINE 10-(β-pyrrolidino-ethyl)-phenothiazine	Pyrrolazote (Upjohn)	Tablet 50 mg. Elixir 2.5 mg./cc. Laminated tablet 50 mg. (enteric-coated 25 mg. core)
	Pyrroxate (Upjohn)	Capsule 12.5 mg. + 25 mg. Orthoxine + 150 mg. acetophenetidin + 220 mg. aspirin + 30 mg. caffeine
N,N-dimethyl-N′-(2-pyridyl)-N′ (3-thenyl)-ethylenediamine	Thenfadil (Winthrop-Stearns)	Nasal Solution 0.1% + 0.25% Neo-Synephrine



Seyler and Marsh have shown that attachment of an atom of oxygen causes the most toxicity and drowsiness and is second in antihistaminic potency in animal experiments. Likewise, attachment of an atom of nitrogen produces the best antihistaminic activity, while linkage through a methyl group gives the third best antihistaminic activity, but produces least toxicity.

Group I. The compounds which have an oxygen in the dimethylamino-ethylene linkage are Benadryl and Decapryn. These compounds have similar activity. Decapryn, although more toxic in animals, is effective in smaller doses and thus need not be given in as large a dose. Patients receiving either of these two drugs are likely to experience some degree of sedation. Dramamine, a modification of Benadryl, has definite beneficial effects in motion sickness and some cases of nausea accompanying pregnancy. Diphenhydramine (Searle) is identical in structural

formula to Benadryl (Parke-Davis). The Searle product, combined with 100 mg. of aminophylline is known as Hydryllin.

Group II. There are at least nine compounds having linkage of the dimethylaminoethylene radical through a nitrogen atom. Seyler and Marsh have divided these into two sub-groups. Three of the compounds have a benzyl radical as part of "R," which increases basicity of the large "R" about 300 times. These compounds are Pyribenzamine, Neo-Antergan and Neohetramine. There is very little clinical difference between Pyribenzamine and Neo-Antergan. Neohetramine has a pyrimidyl group substituted for the pyridyl group, which reduces its antihistaminic potency, but also lowers its toxicity in animals. Clinically, side reactions to Neohetramine are encountered in less than 10 per cent of patients, making it the antihistaminic of choice in one of the most popular of the cold remedies (Anahist).

The other sub-group with nitrogen atom linkage to the dimethylaminoethylene radical has a thenyl group within the "R" portion and is represented by Diatrine, Histadyl (which is chemically identical to Thenylene), Tagathen Thenfadil, Pyrrolazote and Chlorothen. Although the antihistaminic activity is increased by the substitution of a 2-pyridyl group for the phenyl group, as is illustrated by Histadyl and Tagathen, this may increase toxicity. In animal experiments Tagathen exhibits a further increase in activity by the addition of a chloride atom in the five position of the thenyl radical, however, clinically, it seems similar to the compounds without the chloride. Thenfadil, with the pyridyl and 3-thenyl rings, is a potent antihistaminic and very effective clinically. Pyrrolazote, as can be seen from the formula, has an unusual linkage of "R" through the nitrogen atom and instead of the usual dimethylaminoethylene, there is a four carbon ring attached to the aminoethylene portion of the molecule. The appearance of the sulfur atom in the "R" portion, suggests that it belongs to the second sub-group. Duration of effect of Pyrrolazote is long, by laboratory experiment, and is a potent histamine antagonist. It is less toxic than Pyribenzamine in the laboratory. Clinically, it has been helpful in selected patients for relief of symptoms. Chlorothen, one of the newer compounds, is similar to other drugs in Group II having a nitrogen linkage. There is good clinical relief from it when used for the allergic conditions which respond well to the other antihistaminics.

Group III. The use of a methyl group to connect the "R" to the dimethylaminoethylene is employed in Trimeton and Chlor-trimeton. Although less potent pharmacologically, it produces few side reactions. Addition of a chloride atom enhances antihistaminic power so that only two to four milligrams of the drug need be given for a therapeutic dose. It is unlikely to cause toxicity or drowsiness. Wakefulness occasionally is reported.

Group IV. This miscellaneous group contains antihistaminics which do not fit into the three described. Antistine, one of the oldest of the compounds is very weak, but is good to use for ophthalmic drops or for local application because it is not irritating. Wakefulness rather than sedation is the commonly seen side reaction. It is thought that the imidazoline portion hydrolyzes in the tissues to produce the dimethylamino group described as necessary for antihistaminic effect.

Thephorin has a structural formula which is different from the others. It is thought that by breaking the ring at the nitrogen linkage, it breaks down in the tissues to form dimethylaminoethylene. Clinically it is good, particularly in patients who complain of drowsiness from the other compounds. Sleeplessness and nervousness are the commonly seen side effects of Thephorin.

Perazil and Di-Paralene use the piperazine ring rather than the ethylenediamine compound, but it is possible that in the tissues the piperazine ring breaks and the dimethylaminoethylene structure is formed. These compounds are extremely effective as antihistaminics. Side effects are not commonly seen, and duration of effect is long. It is not as long as 24 hours, but may last from 6 to 10 hours.

Thus Seyler and Marsh have shown that there are four groups of antihistaminic compounds, and there is a certain degree of similarity in clinical effectiveness within the members of each group. Therefore, in testing a patient's reaction to the drugs, it is wise to select a member from each group and administer the drug from each group selected for one day's trial at 6 hour intervals. If this drug does not give good results, then the patient is advised to change to a compound in the second group, and the same course is followed. After another day, the third group is used, and finally one of the miscellaneous is tried.

CHOICE

If sedation is desired, one might be inclined to try Benadryl or Decapryn first. In a patient who is disturbed or complaining of pruritus, the mild sedation might be most beneficial.

Since gastrointestinal upset is not uncommon in patients taking compounds in group two, it might be well to try compounds from groups three or four in patients with upset stomachs.

Drowsiness is much less frequent in patients taking drugs of group two, and also members of group four; therefore, for people who have to work or drive an automobile, these drugs should be tried first. Members of the miscellaneous group should be tried early in patients who do not respond to any of the rest since, occasionally, relief is obtained from them when all others do not help. But this is true in every group, and one should not assume that no antihistaminic is going to help the symptoms of his patient until he has tried the members of each group rather thoroughly. The individual response on the part of the patient is one of the intriguing mysteries of these drugs.

SUMMARY

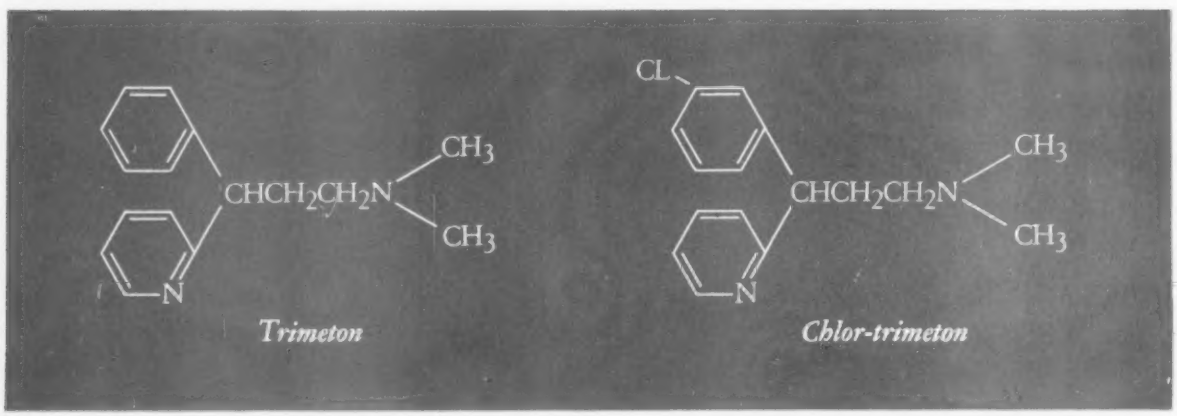
The antihistaminic drugs are not curative, and should not replace careful medical methods of diagnosis and treatment. They should not be used in place of hyposensitization in allergic conditions where it might be indicated. They should be regarded for what they are, a helpful tool in the hands of the physician for relieving symptoms while he is bringing under control the disease which is present.

References

1. Von Pirquet, C.: Allergie. Berlin, 1908. Julius Springer.
2. Dale, H. H. and Laidlaw, P. P.: The physiological action of betaimidazolylethylamine, *J. Physiol.*, **41**:318, 1910.
3. Barger, G. and Dale, H. H.: The presence in ergot and physiological activity of beta-imidazolyl-ethylamine, *J. Physiol.*, **40**:38, 1910.
4. Lewis, T.: The Blood Vessels of the Human Skin and Their Responses. London, 1927, Shaw and Sons.
5. Dale, H. H.: Some chemical factors in the control of the circulation, Lancet, **216**:1233, 1929.
6. Best, C. H., Dale, H. H., Dudley, H. W. and Thorpe, W. V.: The nature of the vasodilator constituents of certain tissue extracts, *J. Physiol.*, **62**:397, 1947.
7. Watanabe, K.: Quantitative Untersuchungen über den Gehalt an Darmkontrahierenden Stoffen von Lunge und Leber bei Meershweinchen in Stadium der Eiweissensibilisierung und im anaphylaktischen Schock, *Ztschr. f. Immunitätsforsch, u. exper. Therap.*, **72**:50, 1931.
8. Hill, J. H., and Martin, L.: A review of Experimental Studies of Non-Specific Inhibition of Anaphylactic Shock, *Medicine*, **11**:141, 1932.
9. Horton, B. T., MacLean, A. R., and Craig, W. McK.: A New Syndrome of Vascular Headache: Results of Treatment with Histamine; Preliminary Report, *Proc. Staff Meet., Mayo Clin.*, **14**:257, 1939.
10. Sheldon, J. M., Feil, N., Johnston, J .H., and Howes, H.: A Clinical Study of Histamine Azoprotein in Allergic Disease (Preliminary Report), *J. Allergy*, **13**:18, 1941.
11. Best, C. H.: Disappearance of Histamine from Autolyzing Lung Tissue, *J. Physiol.*, **67**:256, 1929.

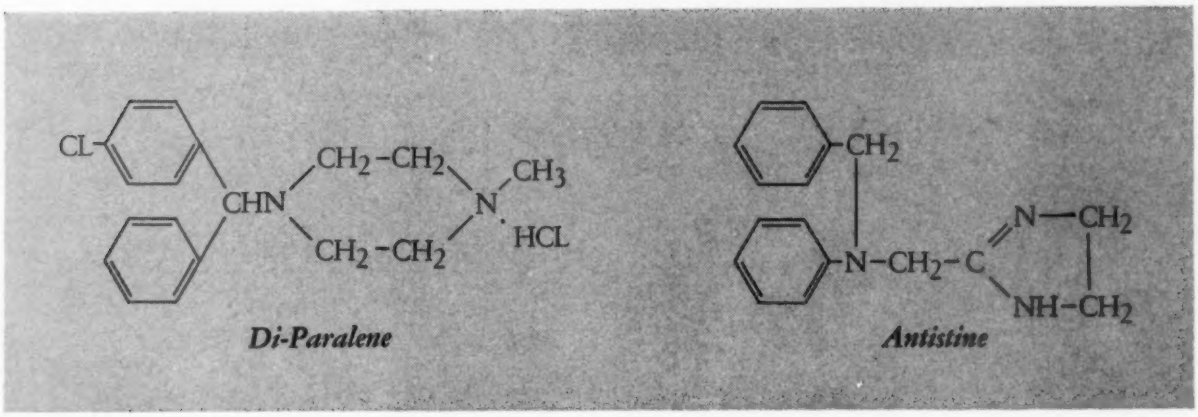
GROUP III

GENERIC AND CHEMICAL NAME	TRADE NAME AND COMPANY	DOSAGE FORMS
CHLORPROPHENYPYRIDAMINE (MALEATE) 1-*p*-chlorophenyl-1-(2-pyridyl)-3-dimethylaminopropane	Chlor-Trimeton (Schering) Coricidin (Schering)	Tablet 4 mg. Tablet 2 mg. + 220 mg. aspirin + 150 mg. acetophenetidin + 30 mg. caffeine
PROPHENPYRIDAMINE 1-phenyl-1-(2-pyridyl)-3-dimethylaminopropane	Cehistra (Organon) Trimeton (Schering)	Effervescent tablet 10 mg. (maleate) + 100 mg. ascorbic acid + 320 mg. aspirin + 1.82 Gm. sodium bicarbonate, calcium hydroxide, citric acid. Tablet 25 mg. Elixir 7.5 mg./4 cc. Ointment 3%

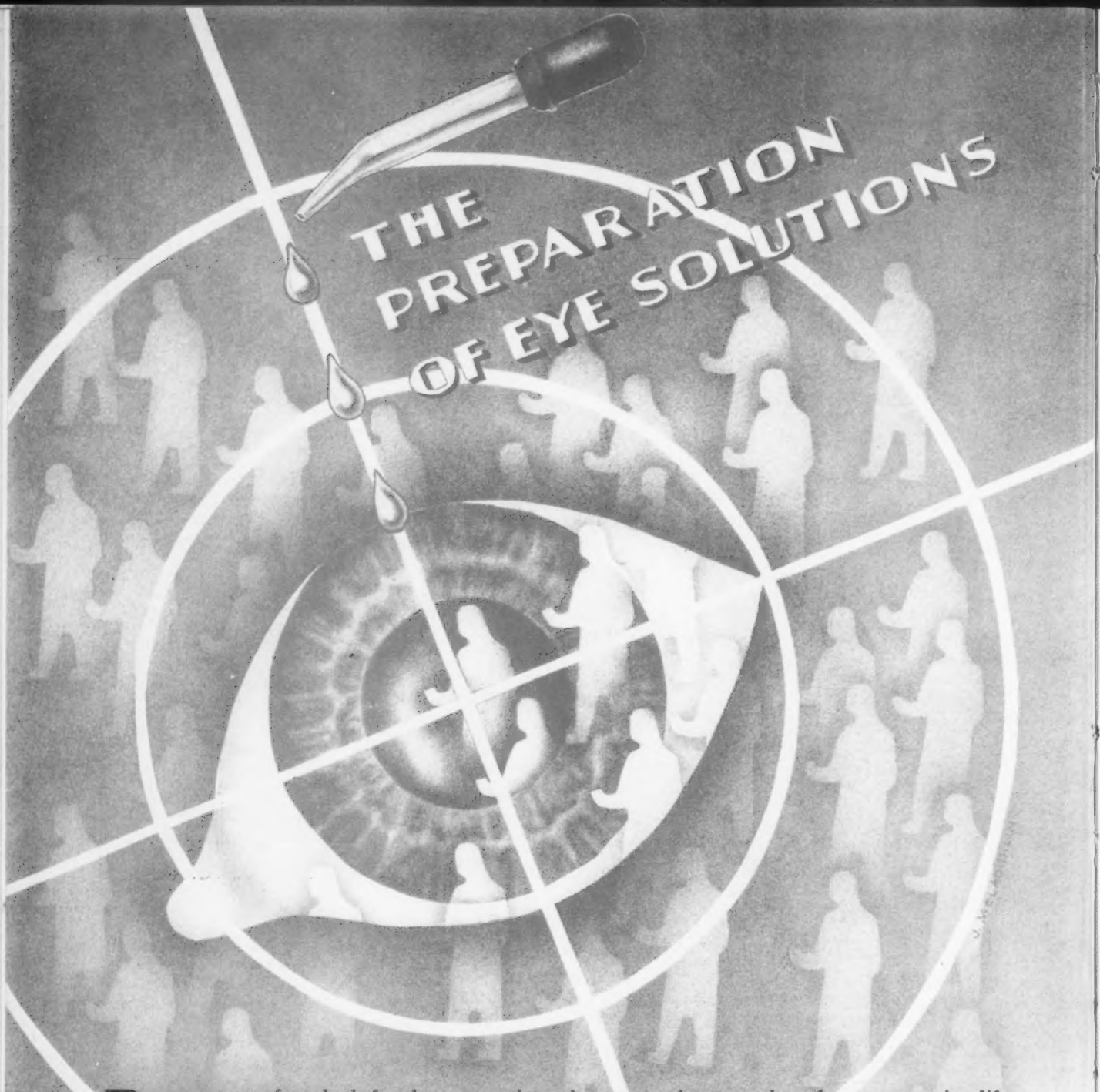


GROUP IV

GENERIC AND CHEMICAL NAME	TRADE NAME AND COMPANY	DOSAGE FORMS
ANTAZOLINE (HYDROCHLORIDE) 2- (N-benzylanilinomethyl)-imidazoline	Antistine (Ciba)	Tablet 100 mg. Ophthalmic solution 0.5% Nasal solution 0.5% + 0.025% Privine Hcl.
CHLORCYCLIZINE (HYDROCHLORIDE) N- (*p*-chlorobenzhydryl-N'-methylpiperazine	Di-Paralene (Abbott) Perazil (Burroughs Wellcome)	Tablets 25 mg. and 50 mg. Tablet 50 mg.
PHENINDAMINE (TARTRATE) 2-methyl-9-phenyl-2,3,4-9-tetrahydrolpyridindene	Thephorin (Hoffmann LaRoche)	Tablet 25 mg. Liquid 10 mg./4 cc. Ointment 5% in Carbowax base Lotion 5% Tablet 10 mg. + 160 mg. aspirin + 160 mg. acetophenetidin + 15 mg. caffeine Expectorant 10 mg./4 cc. + 4 mg. codeine phosphat + 4 mg. papaverine Hcl. + 50 mg. ammonium chloride + 0.016 cc. chloroform Injection 12.5 mg./cc.



12. Rose, B. and Browne, J. S. L.: Effect of Histaminase Pretreatment on Histamine Shock in Guinea Pigs, *J. Immunol.*, **41**:409, 1941.
13. Edlbacher, S., Jucker, P., and Baur, H.: Die Deeinflussung der Darmreaktion des Histamins durch Aminosäuren, *Ztschr. f. physiol. Chem.*, **247**:63, 1937.
14. Landau, S. W. and Gay, L. N.: Influence of Certain Amino Acids on Histamine Reactions and Anaphylactic Reactions in Intestinal Strips of Guinea Pigs and in Intact Guinea Pigs, *Bull. Johns Hopkins Hosp.*, **74**:55, 1944.
15. Fourneau, E. and Bovet, D.: Recherches sur l'action sympathicolytique d'un nouveau dérivé du dioxane, *Arch. internat. de pharmacodyn. et de thérap.*, **46**:178, 1933.
16. Staub, A. M.: Recherches sur quelques bases synthétiques antagonistes de l'histamine, *Ann. Inst. Pasteur*, **63**:400, 1939.
17. Halpern, B. N.; Etude expérimentale des antihistaminiques de synthèse: Essais de chimiothérapie des états allergiques, *J. de méd. de Lyon*, **23**:409, 1942.
18. Bovet, D. Horclois, R. and Walthert, F.: Propriétés antihistaminiques de la N-p-méthoxybenzyl-N-diméthylaminoethyl a aminopyridine, *Compt. rend. Soc. de biol.* **138**:99, 1944.
19. Loew, E. R., Kaiser, M. E., and Moore, V.: Synthetic Benzhydryl Alkamine Ethers Effective in Preventing Fatal Experimental Asthma in Guinea Pigs Exposed to Atomized Histamine, *J. Pharmacol. & Exper. Therap.* **83**:120, 1945.
20. Mayer, R. L., Huttner, C. P., and Scholz, C. R.: Antihistaminic and Anaphylactic Activity of some a-Pyridinoethylenediamines, *Science*, **102**:93, 1945.
21. Loveless, M.: Therapeutic side Effects of Pyribenzamine and Benadryl; a comparative study based on a survey of 26 clinical reports in the literature, *Am. J. Med.*, **3**:296, 1947.
22. Feinberg, S.: Histamine and antihistaminic agents. Their experimental and Therapeutic Status, *J.A.M.A.*, **132**:702, 1946.
23. Budnitz, J.: The Use of Benadryl in Parkinson's Disease, (A Prelim. Report), *New Eng. J. Med.*, **238**:874, 1948.
24. Cowan, D. W. and Diehl, H. S.: Antihistaminic agents and Ascorbic Acid in the early treatment of the Common Cold, *J.A.M.A.*, **143**:421, 1950.
25. Dews, P. B. and Graham, J. D. P.: The Antihistamine Substance, 2786 RP, *Brit. J. Pharmacol.* **1**:278, 1946.



DEVELOPMENT of methods for the preparation of solutions to be employed in treating afflictions of the eye has occupied the attention of pharamacists and others for many years. Although originally the preparation of ophthalmic solutions consisted simply of dissolving the prescribed medication in water, the discovery of the importance of the osmotic pressure and *p*H of such preparations has rendered the problems involved much more complex. In recent years we have seen a large number of attempts to simplify methods of preparation, some with greater and others with less practical success.

Simultaneously, evidence has been accumulating which shows that one of the fundamental concepts of the osmotic properties of the lacrimal fluid, the concept upon which all methods of preparation have been primarily based, was founded on erroneous observations.

At the present time, due to the results of research reported in the last five years, it is possible to prepare completely adjusted collyria on an experimentally sound basis and by simple, practical methods.

Elmon L. Cataline, Ph.D., is associate professor of Pharmacy at the College of Pharmacy, University of Michigan. Presented at the Sixth Institute on Hospital Pharmacy, Ann Arbor, Michigan, June, 1950.

It is the purpose of this discussion to review these recent developments in the hope that such a review may be of interest and assistance to those who are called upon to prepare collyria.

EARLY WORK

Until very recently, virtually all methods for the preparation of solutions isotonic with the lacrimal fluid have been based on the assumption that lacrimal fluid is isotonic with a 1.4 per cent solution of sodium chloride. This assumption apparently had its origin with Massart, who, in 1889, reported the results of his investigation of lacrimal fluid.[1] In 1906, Hamburger[2] reinvestigated the lacrimal fluid and came to the same conclusion. In 1913, Lumiere and Chevrotier,[3] who were very active and respected workers in this field, suggested that, in order to avoid the application of hypotonic solutions to the eye, most ophthalmic solutions should be prepared by dissolving the medicament in a 1.4 per cent solution of sodium chloride, or its equivalent osmotically. While this suggestion did not necessarily imply that the last-named investigators believed the lacrimal fluid to be isotonic with a 1.4 per cent solution of sodium chloride, it had the effect of establishing that figure as the correct value. This suggestion of Lumiere and Chevrotier was widely accepted and became the basis of most, if not all, methods of calculation and preparation.

LATER INVESTIGATIONS

In 1930, Ridley[4] reported that his investigations showed that the freezing point of tears was −0.551 ° C. This corresponds well with the freezing point of a 0.9 per cent solution of sodium chloride. In 1945, Krogh, Lund and Pedersen-Bjergaard,[5] employing the vapor pressure method, showed that lacrimal fluid is equivalent in osmotic concentration to a 0.9 per cent solution of sodium chloride. Since the conclusions of these investigators were based on carefully conducted dependable experimental methods, there can now be no doubt of the osmotic equivalence of the lacrimal fluid and a 0.9 per cent solution of sodium chloride. An additional bit of evidence is found in the statement of Hind and Goyan[6] that the contact lens solutions judged to have optimum wearing qualities by the majority of a large number of patients possessed a tonicity corresponding to a freezing point of −0.54 ° C. which, again, corresponds well with that of a 0.9 per cent sodium chloride solution.

It is now clear that the methods of calculation involved in the preparation of ophthalmic solutions must be revised in the light of this new development. The preparation of isotonic collyria must be on the same basis as that for solutions which are to come in contact with the blood serum, namely, that they should possess an osmotic pressure equivalent to that of a 0.9 per cent solution of sodium chloride. It should be emphasized that it is not meant that collyria prepared in such a way as to be isotonic with a 1.4 per cent sodium chloride solution are worthless, for such is obviously not the fact. However, since it has been definitely shown that such a basis is fundamentally incorrect, there seems to be no reason why the change should not be made. In this connection, it should be borne in mind that the eye possesses a wide tolerance to solutions of varying osmotic pressure, and that in some instances hypertonic solutions appear to be desirable.

As a result of these new findings, the Danish Pharmacopoeia Commission initiated an investigation intended to develop a dependable procedure for the preparation of isotonic collyria. The purpose and scope of this investigation are succinctly stated by Professor K. A. Moller, chairman of the Danish Pharmacopoeia Commission, in the preface of the resulting publication[7]:

> "During the work on the new edition of the Danish Pharmacopoeia, it very soon became evident that the question of the correct osmotic concentration in liquids for instillation into the conjunctiva could hardly be answered on the basis of the literature concerning this subject, a literature which seems to be characterized more by tradition than by experience based on experiments. So it was decided to submit the problem to a closer examination, and in addition to examine the possibility of arriving at such prescriptions as would allow the preparation of other eyedrops than the official ones, so as to give them the correct osmotic concentration. When this proved to be possible, the work was extended so as to include solutions for injection, both official and non-official ones."

The result of the first part of the Danish investigation has already been referred to, it being the demonstration by Krogh, Lund and Pedersen-Bjergaard[5] that the lacrimal fluid is equivalent in osmotic concentration to a 0.9 per cent solution of sodium chloride.

METHODS

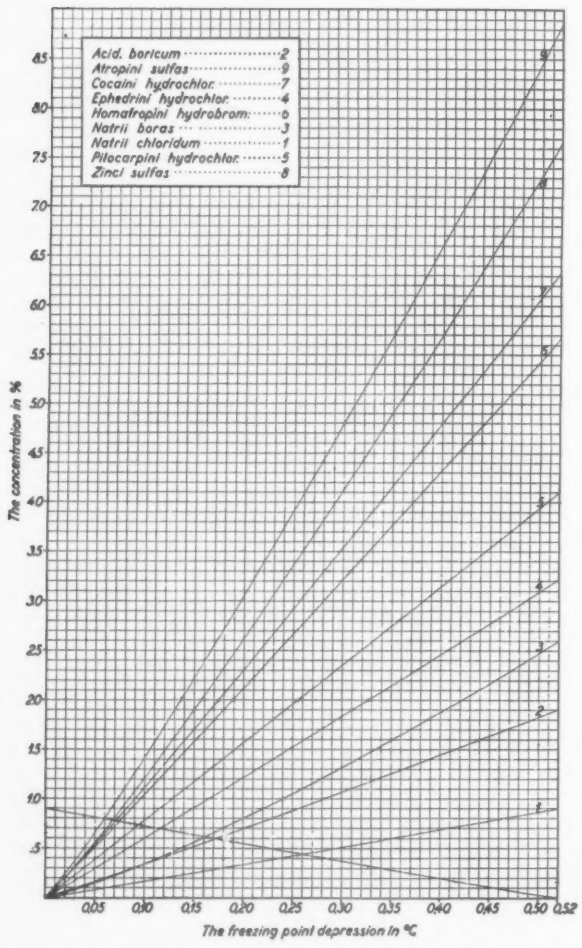
The experimental work of the second part of the investigation, which was conducted by the Danish hospital pharmacists, Lund, Nielsen and Pedersen-Bjergaard,[7] involved the determination, either directly or by calculation from vapor pressure measurements, of the variation of freezing point with concentration, for solutions of over ninety medicaments. In the direct determi-

nations, the error arising from the disengagement of some of the water as ice during the cooling and before the solution as a whole freezes, was eliminated by direct weighing. Thus, the determinations must be considered to be completely reliable.

One significant result of these determinations is the finding that a 0.9 per cent solution of sodium chloride freezes at −0.52 ° C. and not at −0.56 ° C., the temperature commonly employed in osmotic calculations. This is not a new discovery for several investigators have previously reported this value. However, it does emphasize that present methods of calculation are slightly in error.

The freezing point data obtained were expressed in graphical form, the concentrations of the solutions being plotted against the freezing points. One of these graphs is represented below (Fig. 1). The curves which rise from the origin are properly identified in the legend. The curve which slopes downward from left to right is a "mirrored" or reversed sodium chloride curve.

FIGURE 1


Acid. boricum 2
Atropini sulfas 9
Cocaini hydrochlor. 7
Ephedrini hydrochlor. 4
Homatropini hydrobrom. 6
Natrii boras 3
Natrii chloridum 1
Pilocarpini hydrochlor. 5
Zinci sulfas 8
The concentration in %
The freezing point depression in °C
.05 .10 .15 .20 .25 .30 .35 .40 .45 .50 .52

These graphs may be used to determine the amount of sodium chloride or other substance which must be added to a solution to render it isotonic. An example will illustrate the procedure. Suppose that a 1 per cent solution of homatropine hydrobromide is to be prepared so that it is isotonic with lacrimal fluid. Find the point on the ordinate corresponding to 1 per cent; move horizontally until this line intersects the medicament curve; then move downwards or upwards to the "mirrored" sodium chloride curve, and then horizontally to the ordinate where the percentage of sodium chloride is scaled off. It will be seen that 0.71 per cent of sodium chloride will be required. The same procedure is employed when potassium nitrate or other substance is to be added to render a solution isotonic, the appropriate mirrored curve being used.

COMPARISON OF METHODS

Since the results obtained by the graphical methods just described are entirely valid, it is now possible to assess the validity of some of the commonly used methods of calculation. In Table I are listed the results of the calculation of the percentages of sodium chloride necessary to render the designated solutions isotonic with lacrimal fluid. The only changes made from the usual procedures were as follows: in the freezing point method, the figure −0.52 ° C. was used rather than −0.80 ° C., the usual figure; calculations by the method of sodium chloride equivalants were on the basis of a 0.9 per cent solution of sodium chloride rather than 1.4 per cent; in the Nicola method the isotonicity factor for blood serum, 0.0286, was used in place of the tear factor, 0.04307. These changes take into consideration the findings previously described. The selection of medicaments was necessarily limited to those reported on by the Danish workers and for which the appropriate data are readily available for calculation by the other methods.

It is seen that there is general agreement of the results obtained by the various methods of calculation. This agreement is not surprising when it is considered that, having made the changes indicated, all of these methods are then established on the same basis. The important point to be noted is that either the freezing point method, the sodium chloride equivalent method, or the less-commonly used Nicola method appear to yield satisfactory results, provided the indicated changes are made. Obviously, it is impossible to conclude from the evidence offered here that the same agreement would be found with all possible medicaments, since experimental proof would be necessary to warrant such a conclusion. However, it is reasonable to assume that this could very well be the case since (1) the freezing points listed in published tables have been either experimen-

TABLE I
COMPARISON OF METHODS OF CALCULATION

Medicament	Per Cent Solution	Per Cent Sodium Chloride to be Added: Graphic method	Sodium Chloride equivalent method	Freezing point method	Nicola method
Alum (Potassium)	1	0.72	0.71	0.71	0.71
	2	0.56	0.52	0.52	0.50
Alypin HCl	1	0.67	0.72	...	0.75
	2	0.50	0.54	...	0.60
Atropine Sulfate	1	0.76	0.76	0.76	0.81
	2	0.65	0.62	0.62	0.72
Boric Acid	1	0.40	0.45	0.35	0.39
	1.5	0.15	0.08	0.08	0.14
Cocaine HCL	1	0.75	0.71	0.71	0.76
	2	0.59	0.52	0.52	0.62
Cupric Sulfate	1	0.72	0.75	0.74	0.71
	2	0.59	0.60	0.59	0.52
Ephedrine HCl	1	0.61	0.62	0.62	0.67
	2	0.33	0.34	0.52	0.43
Ethylmorphine HCL	1	0.74	0.74	0.74	0.78
	2	0.59	0.58	0.56	0.65
Homatropine HBr	1	0.73	0.71	0.71	0.77
	2	0.56	0.52	0.52	0.63
Phenacaine HCl	1	0.71	0.74	...	0.76
	1.5	0.63	0.66	...	0.70
Physostigmine Sal.	1	0.73	0.71	0.71	0.79
Pilocarpine HCl	1	0.67	0.68	0.68	0.71
	2	0.45	0.46	0.45	0.51
Zinc Sulfate	1	0.75	0.75	0.74	0.74
	2	0.60	0.60	0.59	0.57

tally determined or calculated from other experimental data by unassailable methods, and (2) the available sodium chloride equivalents have been calculated from freezing point data. Therefore, we may, with some degree of assurance, conclude that there is reason to believe that our commonly used methods of calculation will yield satisfactory results, provided they are altered as previously indicated.

BUFFERED AND ISOTONIC COLLYRIA

Although it has been recognized for many years that the ideal collyrium should be buffered as well as isotonic, it is only recently that it has been possible to prepare such solutions without recourse to involved calculations and manipulations. In 1947, White and Vincent[8] devised a series of solutions, both buffered and isotonic, which, by means of a simple calculation, can be employed to prepare completely adjusted collyria, solutions for injection, or nose drops. These solutions have been designated "diluting solutions." Those to be employed for the preparation of collyria were so formulated that they possessed a freezing point of approximately −0.80 ° C., while those for the preparation of nose drops freeze at about −0.56 ° C. Since it has been shown that the freezing point of lacrimal fluid is −0.52 ° C., it is evident that unless a distinctly hypertonic solution were desired, those solutions, recommended by White and Vincent, having a freezing point of −0.56 ° C. should be used for the preparation of collyria.

The following are the formulas of the White and Vincent diluting solutions of freezing point approximately −0.56 ° C.

DILUTING SOLUTION

*p*H approximately 6.75

Potassium Phosphate, monobasic	4.28 Gm.
Sodium Phosphate (anhydrous)	5.72 Gm.
Sodium Chloride	4.37 Gm.
Distilled Water, to make	1000 cc.

DILUTING SOLUTION

*p*H approximately 7.4

Potassium Phosphate, monobasic	1.90 Gm.
Sodium Phosphate (anhydrous)	8.10 Gm.
Sodium Chloride	4.11 Gm.
Distilled Water, to make	1000 cc.

The use of these diluting solutions is based on the following formula:

$$V = W \cdot E \cdot v$$

where:

V = the volume of isotonic solution which can be made by dissolving the prescribed quantity of medicament in distilled water.
W = the weight of medicament prescribed.
E = the sodium chloride equivalent. (from tables)
v = the volume in cc. (or minims) of isotonic solution which can be made from 1 Gm. (or 1 gr.) of sodium chloride.

For calculations in the metric system the value of v is 111.1; for apothecaries' system, 117.6. The following example will serve to illustrate the method of calculation and preparation.

Physostigmine Salicylate 1.0% in Buffered, Isotonic Solution, *p*H 6.75 30 cc.

W = 0.3 Gm.; E = 0.19 (from table); v = 111.1

$$V = 0.3 \times 0.19 \times 111.1$$

$$V = 6.3 \text{ cc.}$$

The 0.3 Gm. of physostigmine salicylate is dissolved in enough water to make 6.3 cc. of solution and the appropriate diluting solution is added in sufficient quantity to make 30 cc.

If more than one medicament is prescribed, V is calculated for each substance and the values added to give a composite V. The medicaments

are then dissolved in enough distilled water to make a volume of solution equal to the composite V and diluting solution is added to make the prescribed volume.

Although calculation by this method is simple, Sprowls[9] has suggested a further simplification. Since v is a constant and W has a constant value when it relates to a constant volume of solution of given percentage strength (30 cc. of 1 per cent), the product of $v \times W$ is a constant. Furthermore, since the sodium chloride equivalent of a given substance is constant, the entire right hand side of the White and Vincent equation becomes a constant, or $V = k$. Proceeding on this basis, Sprowls has constructed a table from which V can be determined directly when $W = 0.3$ Gm. or by simple calculation when W is other than 0.3 Gm.

TABLE II *

Values of V, where $V = W \cdot E \cdot v = k$

0.3 Gm. of:	V (k)	0.3 Gm. of:	V (k)
Alum (Potassium)	6.3	Phenol	11.7
Alypin Hydrochloride	6.0	Physostigmine Salicylate	6.3
Amphetamine Sulfate	6.7	Physostigmine Sulfate	4.0
Amylcaine Hydrochloride	6.7	Pilocarpine Hydrochloride	7.3
Antipyrine	5.7	Pilocarpine Nitrate	7.0
Apothesine Hydrochloride	6.3	Potassium Chloride	28.0
Atropine Sulfate	4.7	Potassium Iodide	12.7
Benzyl Alcohol	10.0	Potassium Nitrate	20.0
Boric Acid	18.3	Potassium Phosphate (monobasic)	13.3
Butacaine Sulfate (Butyn SO_4)	3.3	Procaine Hydrochloride	8.0
Caffeine	4.3	Propadrine	10.3
Calcium Chloride (no H_2O)	24.3	Quinine Hydrochloride	5.3
Calcium Gluconate	4.7	Quinine and Urea Hydrochloride	8.7
Calcium Lactate	7.0	Silver Nitrate	13.0
Camphor	7.0	Sodium Acetate (no H_2O)	24.7
Chlorobutanol	6.0	Sodium Benzoate	15.0
Cocaine Hydrochloride	6.3	Sodium Bicarbonate	23.0
Cupric Sulfate	5.0	Sodium Biphosphate	15.0
Dextrose	5.3	Sodium Borate	14.3
Diothane Hydrochloride	4.3	Sodium Bromide	20.7
Emetine Hydrochloride	4.7	Sodium Cacodylate	10.0
Ephedrine Hydrochloride	9.3	Sodium Carbonate, Monohydrated	22.7
Ephedrine Sulfate	6.3	Sodium Citrate	10.7
Epinephrine Hydrochloride	8.7	Sodium Hypophosphite	18.0
Ethylhydrocupreine HCl	5.0	Sodium Iodide	12.7
Ethylmorphine Hydrochloride	5.3	Sodium Lactate	17.3
Eucatropine Hydrochloride	6.0	Sodium Nitrate (no H_2O)	20.7
Fluorescein Sodium	6.3	Sodium Phosphate (no H_2O)	17.0
Glycerin	11.7	Sodium Phosphate ($2H_2O$)	13.7
Homatropine Hydrobromide	6.3	Sodium Phosphate ($7H_2O$)	9.0
Hyoscine Hydrobromide	4.3	Sodium Phosphate ($12H_2O$)	6.7
Hyoscine Hydrochloride	5.0	Sodium Salicylate	13.3
Iodophthalein Sodium	4.0	Sodium Sulfate	9.3
Lactose	3.7	Sodium Sulfite	19.3
Larocaine Hydrochloride	6.0	Sodium Thiosulfate	10.3
Magnesium Chloride ($6 H_2O$)	14.0	Strong Silver Protein (Protargol)	1.3
Magnesium Sulfate	6.7	Sucrose	3.3
Menthol	7.0	Sulfadiazine Sodium	7.0
Mercuric Chloride	4.0	Sulfanilamide	6.7
Mercuric Cyanide (no H_2O)	4.7	Sulfapyridine Sodium	6.7
Mercuric Succinimide	4.7	Sulfathiazole Sod., sesquihydrate	6.3
Methenamine	8.0	Syntropan	4.7
Metycaine Hydrochloride	6.7	Tannic Acid	1.0
Mild Silver Protein	6.3	Tetracaine Hydrochloride	6.3
Morphine Hydrochloride	5.0	Tutocaine Hydrochloride	6.7
Morphine Sulfate	4.0	Urea	18.0
Neosynephrine Hydrochloride	9.3	Zinc Chloride	20.0
Nupercaine Hydrochloride	5.0	Zinc Phenolsulfonate	5.0
Phenacaine Hydrochloride	5.3	Zinc Sulfate	5.0
Phenobarbital Sodium	9.0		

* Adapted from Sprowls, reference 9.

Table II is adapted from the table presented by Sprowls.[9] Examples:

Homatropine Hydrobromide 0.5% in Buffered, Isotonic Solution, *p*H 6.75 30 cc.

Reference to Table II indicates that k for 0.3 Gm. (1 per cent of 30 cc.) of homatropine hydrobromide is 6.3 cc. Since only 0.15 Gm. of the alkaloid is prescribed here, $k = 0.5 \times 6.3 = 3.15$ cc. The 0.15 Gm. of homatropine hydrobromide is dissolved in enough distilled water to make 3.15 cc. and the diluting solution (*p*H 6.75) added to make a final volume of 30 cc.

If more than one medicament is prescribed, the k value for each is determined and the values totaled, giving a composite k value.

It is interesting to note that if the collyrium is not to be buffered, normal saline solution (0.9 per cent sodium chloride) may be used as the diluting solution. In this case the calculations are the same as those indicated above.

SUMMARY

1. During the past few years, evidence has accumulated which shows that lacrimal fluid is isotonic with a 0.9 per cent solution of sodium chloride rather than a 1.4 per cent solution as was formerly supposed. This makes it necessary that methods employed in the calculations involved in the preparation of isotonic collyria be revised.

2. A new, graphical method of calculation has resulted from the research of the Danish hospital pharmacists, Lund, Nielsen and Pedersen-Bjergaard. Calculations presented herein indicate that the usual methods of calculation, yield satisfactory results, provided they are based on the characteristics of a 0.9 per cent solution of sodium chloride.

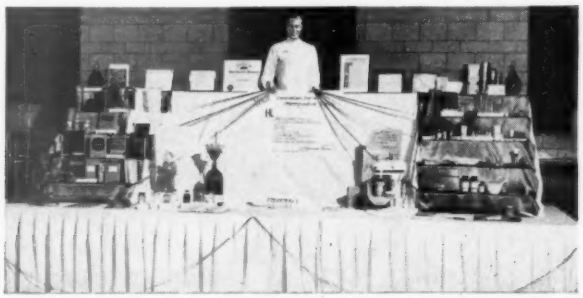
3. The use of the diluting solutions of White and Vincent, along with the simplified method of calculating devised by Sprowls, renders the preparation of buffered, isotonic collyria much simpler than heretofore. The diluting solutions used should be those which are equivalent osmotically with a 0.9 per cent solution of sodium chloride.

References

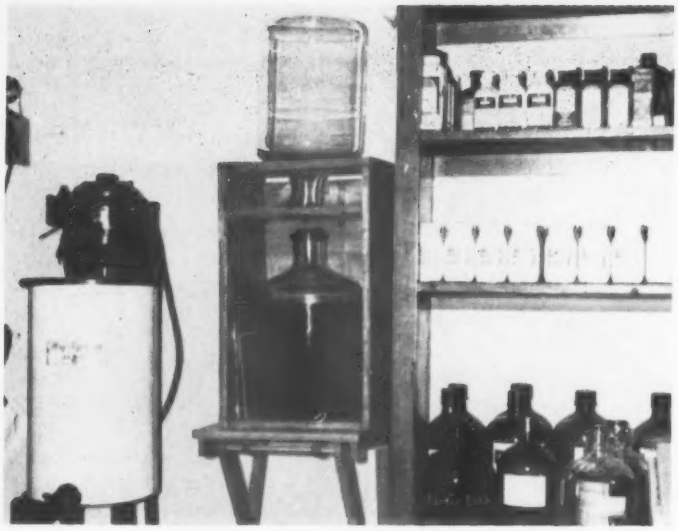
1. Massart, J.: *Arch. de Biol.* **9**:515, 1889. (Through ref. 6.)
2. Hamburger, H. J.: *Compt. Rend. de la Soc. de Biol.* I, **60**:77, 1906. (Through ref. 6.)
3. Lumiere, A. and Chevrotier, J.: Isotonic Solutions in Therapeutics, *Bull. Sci. Pharmacolog.* **20**:711, 1913. (Through *Chem. Abstr.* **8**:2196, 1914.)
4. Ridley, F.: The Intraocular Pressure and Drainage of Aqueous Humor, *Brit. J. Exptl. Path.* **11**:217, (Aug.), 1930.
5. Krogh, A., Lund, C. G., and Pedersen-Bjergaard, K.: Osmotic Concentration of Human Lacrimal Fluid, *Acta Physiol. Scand.* **10**:88, 1945. (Through *Chem. Abstr.* **40**: 1921, 1946.)
6. Hind, H. W. and Goyan, F. M.: A New Concept of the Role of Hydrogen Ion Concentration and Buffer Systems in the Preparation of Ophthalmic Solutions, *J. Am. Pharm. Assoc., Sci. Ed.* **36**:35 (Feb.), 1947.
7. Lund, C. G., Nielsen, E. P. and Pedersen-Bjergaard, K.: "The Preparation of Solutions Isoosmotic with Blood, Tears and Tissue," Heinemann Medical Books, Ltd., London, 1947.
8. White, A. I. and Vincent, H. C.: Diluting Solutions in the Preparation of Adjusted Solutions, *J. Am. Pharm. Assoc., Pract. Pharm. Ed.* **8**:406, (Aug.), 1947.
9. Sprowls, J. B.: A Further Simplification in the Use of Isotonic Diluting Solutions, *ibid.* **10**:348, (June), 1949.

Hospital Pharmacists Exhibit

The accompanying photo shows a unique exhibit which was prepared recently by the hospital pharmacists of Canton and Massillon, Ohio. The exhibit depicts the education of a pharmacist and some of the resulting activities. Active in the preparation and display of the exhibit were Miss Jeanne Tarney, Aultman Hospital, Miss Irene Chosy, Aultman Hospital and William Slabodnick, Massillon City Hospital.



Each of the five steps on the left panel represents a year of pharmacy education. Textbooks and equipment used in various courses presented an idea of the scope of current pharmaceutical education. On the top step the college diploma, apprenticeship papers, State Board certificate are all found to be necessary before the pharmacist can make use of his college training. The steps on the right show some activities of a pharmacist—as teacher of students nurses, compounding prescriptions, preparing ophthalmic solutions, preparing popular antibiotics—neomycin, aureomycin, streptomycin, penicillin, chloromycetin, etc. Bulk manufacture was shown by making a gallon of Elixir Phenobarbital U.S.P. and five pounds of an ointment on the Hobart mixer.



Left, a corner of the Pharmacy at Mt. Carmel; below, Sister Mary Florentine

by SISTER M. FLORENTINE

Pharmacy Department

MOUNT CARMEL HOSPITAL

Columbus, Ohio

SOME YEARS ago every magazine assured the reader, "you too can be the life of the party." In like strain it may be asserted that in small, or medium sized hospitals you too can offer a modern pharmaceutical service, have fine equipment to work with, and get much pleasure out of the necessary routine of the daily work load.

Mount Carmel Hospital is an institution situated in the capital city of Ohio and serving its half million residents as well as those of surrounding rural communities. With only 282 beds and 50 bassinets, it is often hard pushed to serve these people, and the more than two hundred physicians on its active staff. Since there is no outpatient department, but a predominance of private patients attended by such a large number of physicians, the problems presented to the pharmacy more nearly follow those of a professional retail store, with certain exceptions. We have not yet been able to introduce a formulary but have hopes for the future.

Prior to 1942, a nurse was in charge of the pharmacy, with nearby retail stores providing prescription service. Since then there always has been at least one registered pharmacist, first with non-professional, then part-time professional and student assistance, until the present when there are two full-time registered pharmacists. This growth seems very slow, especially in the light of accomplishments elsewhere. But it has been steady and almost unnoticed except in retrospect.

Because of space limitation all expansions have been restricted to putting more into, or accomplishing more in the same circumscribed area. This has often entailed much planning and conniving. The first growth we had was the installation of the Schwartz Sectional System in the upstairs dispensing room. The problem here was (1) to get the maximum number of units into the existing space; and (2) to be rid of a "dutch door" because of its nuisance value in the front hall. The solution was presented by a chance thought that the only possible way seemed impossible—put the stairway out the window. To a keen and understanding administrator this presented no problem at all—it was an accomplished fact; an easier stairway, loiterers out of the hall, and the desired number of fixtures in the same working space, plus an area in the basement where the old stairway was removed, soon to

SISTER M. FLORENTINE is chief pharmacist at Mount Carmel Hospital, Columbus, Ohio.

come in handy as the alcohol storage room required by the Internal Revenue's newest regulation.

In 1942 there were 8,739 patients for a total of 87,265 hospital days. This figure has mounted steadily until 1949 when there was a total of 13,426 patients with a total of 101,397 hospital days, an increase of 65 per cent. While the patient day increase has been steady, the increased volume in the pharmacy has been felt most since the war, mainly because of the increasing use of antibiotics which now account for well over fifty per cent of the daily output. In 1949 over 82,000 orders were filled, an average of a little over six services for each patient admitted.

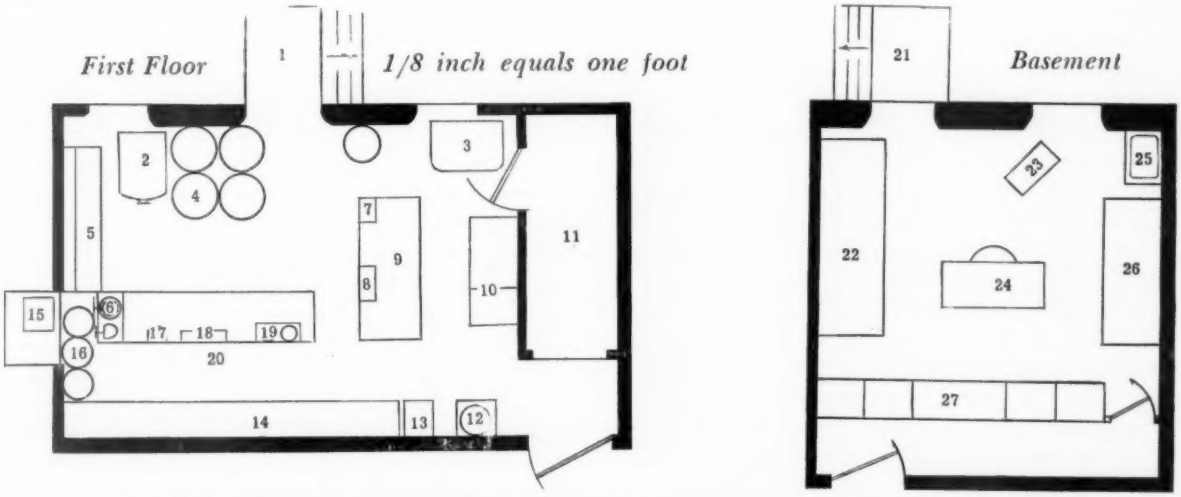
In February of 1946 the one-man staff was augmented by the services of a relocated Japanese-American pharmacist who divided his time between the pharmacy and helping to install a perpetual inventory system in the general stores. His return to California opened the place for further part-time assistance. This need was filled by students from the College of Pharmacy who proved most valuable in several ways: first, as able workers, and then as a means of selling hospital pharmacy to the students who too frequently are unaware of the possibilities of this branch of the field; and finally as a source of future full-time employees. We regret that by having a full-time registered assistant, we are no longer able to help train these young people and look forward to the near future when expanded facilities will enable us to renew this contact with them.

ESTABLISHMENT OF PERPETUAL INVENTORY

After the installation of modern fixtures the next step was the establishment of a perpetual inventory system. Several articles by other hospital pharmacists in the literature detailed their methods and forms. Before adopting any of these, however, we requested forms from Remington Rand because of the availability of a Kardex file discarded with the installation of an electrical posting system in the business office. The necessity was a happy one, for the forms obtained and adapted have been very useful and extremely flexible, so much so, that the pharmacy was not required to adopt the standardized system later installed in the general store rooms. These cards were prepared by volunteer clerical help during the war years and for some time the daily posting on the inventory itself was maintained by these workers. Clerical assistance of this type has the disadvantage of not being familiar with the nomenclature but because of the routine character of most orders, this is soon overcome; and a minute taken in clarifying the request when slips are being filled is helpful. We have been fortunate in having one volunteer who has been doing this posting over a period of years and whose assistance has become invaluable. The inventory has proved useful to the night supervisor in locating items, since we have made a practice of putting the location of new items right on the inventory card when they are admitted to stock.

Our next move was the gradual acquisition of equipment. Equipment is expensive so we have

Mount Carmel Hospital Pharmacy



1. Stairs to first floor, 2. Autoclave, 3. Refrigerator, 4. Drums with pumps, 5. Open shelving, 6. Ointment mill, 7. Penicillin dilution, 8. Scale, 9. Marble top table, 10. Sink and drainboard, 11. Alcohol storage, 12. Alsop mixer (portable), 13. Filter rack, 14. Open shelving, 15. Oven, 16. Dry chemicals, 17. Pump, 18. Stove, 19. Scale, 20. Thirty inch high counter of steel sectional shelving, 21. Stairs to basement, 22. Prescription case, 23. Kardex, 24. Desk, 25. Sink, 26. Manufacturing counter, 27. Schwartz cabinets with opening and counter.

found it desirable to justify any purchase by carefully examining its cost, probable usage, and the savings contingent upon the making of items hitherto acquired commercially. In most instances the original outlay is returned within a twelve-month period. Our first major piece was an Alsop high-speed mixer, acquired primarily on the assumption that the yearly saving on manufacture of milk of magnesia from Hydro-magma paste would pay for the mixer.

NARCOTIC SOLUTIONS PREPARED

Many physicians returning from the armed services had become accustomed to using narcotic solutions intramuscularly so there were many requests especially for morphine by this route. The stocking of separate dosage forms of the drug presented a problem in record keeping. This was temporarily solved by stocking sterile vials on one unit where a high degree of cooperation was obtainable, and notifying the other divisions that they were available there if needed for intramuscular use. After attending the first Institute on Hospital Pharmacy at Ann Arbor the desirability of having all narcotics in this form was apparent. The difficulty of changing from one system to the other seemed almost insurmountable, but again the assistance of the same division was resorted to. During the trial period estimates of proposed savings in nurses' time as well as the cost of material were prepared, and presented to the administrator to demonstrate the need for an autoclave in the department. The War Assets was disposing of a great many sterilizers at this time and we were fortunate in obtaining a new electric model at a great saving. By February of the year following the Institute our program was ready for the transition. After months of "growing pains," the opposition was conquered and the appearance of any form of hypodermic tablet is now met with a great deal of disdain.

These two pieces were obtained by demonstrating the savings made possible by their use. Space has been a greater factor. The mixer was made portable by mounting on a base with casters, enabling it to be moved for use and cleaning. The autoclave presented a different problem—solved by removing the drum rack accommodating four 54 gallon drums, and placing the drums in a vertical position with pumps; thus housing autoclave and drums in the space formerly occupied by the drums alone. Space for the hot air sterilizer, later acquired, was made by removing one shelf in a small built-in storage space. The acquisition this year of an Eppenbach homogenizer has taken the last bit of available room. Until removal to the new department, now being built, any growth will have to be in service. The physical has at last reached its limit.

Some pieces have not been expected to work for a living. The hot air sterilizer and the Beckman *p*H meter fall into this class. They are the elite, the scientific tools which lend prestige. The homogenizer just acquired falls half way between these two classes; it will not pay for itself so soon; rather it will be a refinement on the mixer already in use, but new usages will be found from time to time.

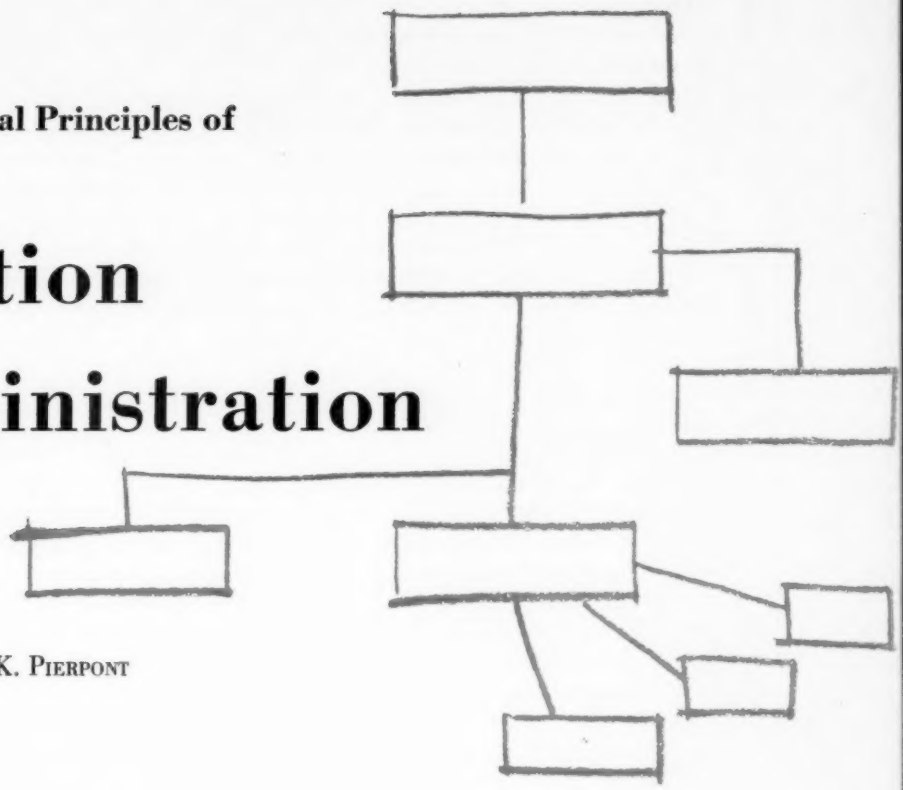
Perhaps our greatest adventure has been the manufacturing and tubing of breast ointment for the maternity department. Formulas presented at the Institute at Princeton in 1948 provided the spark that kindled a long-felt desire. The use of fifteen hundred tubes yearly from a commercial source made this project seem quite desirable from a financial, as well as a professional angle. Confronted with the tube filling problem we looked for small model fillers to find that these were no longer available. Authorization to purchase a hand filler was obtained. Colton and Stokes hand fillers being expensive and larger than needed, the search went on for a more compact unit. Butcher supply shops were solicited for sausage fillers; but deep freezing had supplanted them. Volunteers scoured the rural areas to no avail. Nozzles were found for use on a meat grinder, but the grinder would not accommodate a soft ointment. Then came a happy solution—why not a caulking gun? Our maintenance department obligingly furnished one, cutting off the pointed nozzle and fitting on our sausage stuffing tube—result, a very workable unit which we consider our supreme achievement. This enabled us to buy a hand-powered ointment mill which our maintenance department motorized with a discarded washing machine motor given us by a friend and a fly wheel they purchased. So for less than a hundred of the $150 allotted, we had both mill and filler, with which we have prepared more than 2,500 tubes of ointment during the past eighteen months.

EXPANSION

Within two years we hope to have a new and larger department. Even a new department however, must be limited by the amount of space allotted by the architect who has to curtail the grandiose plans of each department to make a balanced whole. We have been privileged to express our ideas and plans and have them reach the blue print stage. Our adventure then will be in fitting our work habits to this plan and expanding in space for a time. We may even rattle around at first, but not for long; for the future stretches endlessly and there will be new skills to learn and ever new services to render.

Fundamental Principles of

Organization and Administration



By WILBUR K. PIERPONT

IN DISCUSSING with you today some of the fundamental or basic principles in the organization and administration of an enterprise or activity, I have made no attempt to place these principles in any order of significance or importance. To begin, therefore, I would like to draw your attention to a very obvious principle, the necessity for stating clearly and concisely the purpose for which the enterprise or activity exists. For divisions, departments, units, or other subdivisions of the overall enterprise, there should also be statements of their reason for being.

PURPOSE OF THE UNIT ✓

Such a statement of purpose, if it is to be meaningful and useful, may be difficult to make in some instances, although as the scope of an activity is narrowed to specific functions, the purpose in each case may be more easily defined. Whether broadly conceived or narrowly defined, however, the function to be performed by any organized unit must be clearly set forth. The University of Michigan, for example, may be defined as an educational institution but what activities are to be considered as proper for educational institutions? We have attempted to be more specific by stating that the University of Michigan is an institution devoted to instruction, to research, and to public service. Then we go further by defining the areas in which we carry on instructional or research efforts or service activities in behalf of the public. We have a College of Pharmacy, whose purpose, according to the latest bulletin of this College, is "to provide well-balanced courses of study designed to prepare students not only for prescription work and commercial pharmacy but for a great variety of professional positions in the various phases of pharmacy as a whole." Within the College of Pharmacy, the faculty of that College teaches a course called Dispensing Pharmacy, the purpose of which is to "study the technical, professional, and legal aspects of the compounding and dispensing of prescriptions."

Why is it important to state these purposes, to define carefully the objectives of each organized unit of activity?

Statements of purposes are the guide posts to test the day-to-day decisions which have to be made by those responsible for operations. It is more important to decide whether something should be done or some course of action followed than it is to select the best method to be used in implementing a decision already made. And these decisions must be related to a fixed posi-

WILBUR K. PIERPONT, M.B.A., Ph.D., is controller of the University of Michigan.

Presented at the institute on Hospital Pharmacy, Ann Arbor, Michigan, June 1950.

tion, a fairly stable objective.

One decision at a time, over a period of time, can change substantially the nature of an enterprise until there is an awakening to what has happened. By then it may be too late to recover the original purpose, assuming that purpose to be still valid.

It may not seem very significant to those in charge of a Hospital Pharmacy to prepare and distribute a certain kind of toothpaste for a certain type of hospital patient upon the recommendation of a doctor. And this may be done without much, if any, consideration being given to the matter by the hospital policy making staff. The next step is to broaden the service to cover all types of hospital patients. Then, since the process is well organized, since it functions within the Pharmacy without much supervision, and since it may possibly produce a little net income on the side, toothpaste of an ordinary variety is sold to the public who pass by the Pharmacy. Step by step, one decision at a time, the Pharmacy is taking on the characteristics of a manufacturer and distributor of toothpaste. From what I hear about the toothpaste business, this transition may be a desirable one but those who are making it should recognize what is happening. The purpose of the Hospital Pharmacy should be clearly established and held clearly in mind in making decisions about its operations.

Recently, the College of Pharmacy placed in operation some equipment to manufacture certain pharmaceutical supplies as a part of its teaching program. Rather than washing the results of this teaching process down the drain, the College offered to supply the University Storehouse, the University Health Service, and the Hospital Pharmacy with certain of their requirements. The supply of materials for these units is only of secondary importance however, and must not come to be one of the primary objectives of the operations of the College of Pharmacy. Such operations are not within the basic instructional and research purposes for which the College was organized.

ORDER OUT OF CHAOS

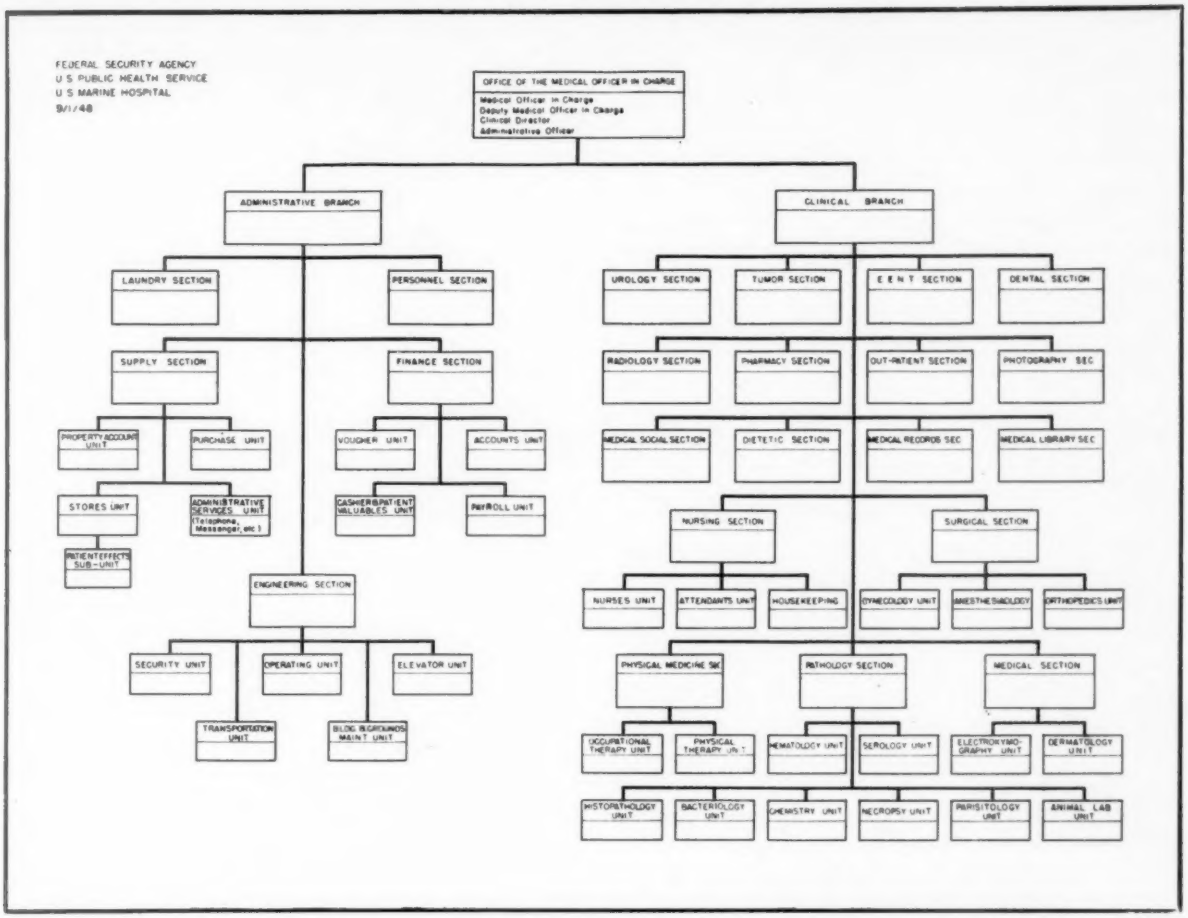
Most enterprises today are sizeable activities, measured in terms of number of people on the payroll, in amount of income or expense, or in amount of service rendered. In order that such activities can be efficiently carried forward, the enterprise must be broken into specific areas of activity each one of which has a definite objective as a part of the overall purpose of the enterprise. The second principle I wish to point out is the need to subdivide or departmentalize a large enterprise into working units which have specific definable purposes. All of you no doubt can think of activities which are so disorganized that no one can make decisions; no one knows what is going on across the hall, or in the next room; no one can proceed on anything without first clearing with some one else. Such situations arise when the overall activity has not been analyzed as to the specific functions involved to accomplish the overall objective, when these specific functions have not then been established in separate operating units which have clear cut purposes, and when the heads of the units have not been given authority to act.

The departmentalization of a large activity into smaller operating units provides an opportunity for a division of labor and a consequent specialization of labor. I need not, I believe, develop the advantages to be gained from a specialized labor force and from trained personnel carrying out tasks and responsibilities which they have selected as their way of making a living. Whatever may be its limitations, and there are some, the departmentalization of activity and the opportunity for specialization arising from this departmentalization is one of the major underlying factors in the economic growth of this country and the western world in the past two hundred years.

Not so many years ago, a large university, not the University of Michigan by the way, followed a rather odd practice in its budget control and payroll operation. About every three or four months during the year, the department chairmen were called together with the administrative officers of the university and were told how much money each one could have to operate his department for the coming semester. These amounts were based on expected tuition income, income on the endowment funds, and other expected income items and were subject to quite accurate prediction. At the same time that the amounts were established, each department chairman was given a check for all or a certain part of this amount. Thereafter, the department chairman deposited his amount in a bank account under his control and each month wrote payroll checks to his departmental personnel.

This practice, I agree, certainly retains to a minimum a centralized budget and payroll office. But I suspect that the university was not obtaining full benefit from the professors on the staff who had been trained in biology, history, chemistry, etc. but who were compelled for part of their time to keep the books of the university. A departmentalization of activity provides an organization structure which will make it possible for an enterprise to obtain the most benefit from the trained personnel on the staff.

TYPICAL ORGANIZATION CHART



The relationship of units to one another can be shown by organization charts adopted as official statements of the internal organization of an enterprise. Organization charts properly drawn point out situations not clearly recognized and may show the need for some revamping of internal relationships.

INTER-RELATIONSHIPS OF UNITS

The departmentalization of an organization into working units establishes the need for a complete understanding of the relationship of each unit to all other units, whether it is a major division or a small section within a department and within a division. The establishment of this "place in the sun" for each unit is a third fundamental principle of organization.

The relationship of units to one another can be shown by organization charts adopted as official statements of the internal organization of an enterprise. Organization charts properly drawn point out situations not clearly recognized and may show the need for some revamping of internal relationships. They may also be completely confusing in their presentation of who fits where.

A few days ago I saw an organization chart of what to me had always been a relatively simple organization devoted to a single, specific purpose. The chart covered a large sheet of paper several feet in length and width and showed not only the major divisions of organization but also the smallest units of organized activity. I am sure that some of the units consisted of not more than one person and I would not be surprised to find that one person might have been all that comprised two or more units. This to me was a needlessly complicated and detailed presentation of the structure of a unit.

I might also point out that in this same chart there was another unusual situation, one individual by name was the head of a major division; he was also the head of one of the departments in another division. That is too much for me.

I am reminded here of the story of one of the exhibits at the Chicago World's Fair of 1893. In one of the exhibition halls, there was a beautiful engine built entirely of glass. All of the necessary parts were incorporated in the design and the

engine shown with brilliance. There was only one thing wrong with this engine, it wouldn't run. I am afraid that some organization charts are masterpieces of design but they just don't portray an organization set-up which will run.

I have not brought samples of organization charts here today as all of you are aware of their existence. May I suggest, however, that when you return home you examine carefully your own organization structure. Is it simple and understandable to your fellow workers? Does it portray exactly the internal workings of your office? Is it available to new employees for their guidance?

NEED FOR FLEXIBILITY

A few minutes ago I spoke about using a statement of purpose as a fixed position to determine if suggested policies are in accordance with this purpose. At any time and for periods of time, of course, the purposes of an organization are relatively fixed. This does not mean, however, that they are fixed indefinitely. The commitments of one generation, of one decade, or of one year are not established in perpetuity. They are established in the light of various circumstances, the needs and desires of a given situation, the characteristics or peculiarities of individuals. A fourth principle that I wish to state, then, is that an organization should be sufficiently flexible over a period of time to meet the changing needs of the times. All too often we place blinders on ourselves and others and proceed year in and year out to do the same things in the same way.

The activities of an organization may need to change in two ways, in the amount of work accomplished or in the kind of work carried on. Let me illustrate this point by referring once again to the University of Michigan.

Some years ago we had an enrollment of 11,000 to 12,000 students. Now we have an enrollment of 20,000 to 21,000 students. This increase in size alone has caused us to review our organization structure, to make changes in it to accomplish certain objectives more efficiently and adequately, to shift the responsibility for specific activities from one unit to another, to establish new units. At the University Hospital, the outpatient facilities occupy the first floor of the hospital which was built in 1925. These facilities were planned for a maximum capacity of 7,000 outpatient visits per month but last year an average of 21,000 outpatient visits were cleared through the clinic per month. The new Outpatient Clinic, for which funds have recently been appropriated by the State Legislature, will be so organized that this great increase in patient load can be properly cared for. I daresay that many of the methods, the procedures, and the relationships now in operation in the present Outpatient Clinic will be superseded by an organization better adapted to meet the demands of today. This change will be brought about only by a conscious attempt on the part of those responsible to establish the best organization set-up for the new clinic.

It is not often that an opportunity like this presents itself; more often it is necessary to provide make-shift solutions not completely satisfactory to anyone.

STUDY YOUR PHARMACY'S OPERATIONS

Not only is it necessary to be able to absorb within a given organization structure large scale changes in the amount of service rendered but each organization structure must be able to absorb shifts in the nature of the service to be rendered. It may seem to you that the Pharmacy is only called upon to do more and more but I suspect that if you were to look back over a few years you could point out several areas of work which have been discontinued to be replaced by newer projects. Certainly medical knowledge has made great strides in the past few years in the alleviation of many illnesses and this progress has had its effects on the Hospital Pharmacy. If you are burdened, I probably should say overburdened, with demands on your services, may I suggest that you sit down and by yourself some day, take a look at all that you do, and in each instance, ask yourself, why do we do that now? It is probably true that each operation performed today originated out of a necessity in the beginning but does that same necessity now exist? Have other requirements superseded the old requirements so that you are now carrying two loads, one load adapted to the requirements of previous years, and a second load required for present day operations?

I appreciate the fact that it is much more difficult to reorganize your activities to provide a new and altered set of services, since this requires a critical look at yourselves, than it is to reorganize to provide a greater amount of services. The latter shift often calls for more personnel and this addition of personnel alone permits a freedom of movement not otherwise available.

In the growth of an enterprise or in the shifting around within an enterprise, that is an enterprise of any size, sooner or later questions involving a centralization of operations versus a decentralization of operations will arise. There may or may not be a principle to be established in this connection but certainly there is an issue. I suspect that in most organizations the issue is never settled, at least for any length of time; and

I don't see any reason why at any time it should be definitely settled for all time.

CENTRALIZATION VS DECENTRALIZATION

On the face of it, and I realize that I am about to make a rather broad statement which should be qualified, it seems to me that those who would centralize operations should have to build an offense to support their case whereas those who would decentralize their operations are following a more easily defended course of action. The main point to be made in support of this statement is this, the best place to make decisions is at the point where the problems arise, not some other place. Moreover, I think you are likely to obtain a more thorough consideration of a problem if those who make the decision have to live with the decision made.

I think it is true that decentralized operations may cause in some instances more problems than the opposite approach and there are certain necessary activities or prerequisites which go hand in hand with a policy of decentralization.

OPERATING DECISIONS VS POLICY DECISIONS

A decentralization of operations does not carry with it a decentralization of the policy making function. It is necessary, therefore, to train personnel to recognize the distinction between operating procedures and activities and policy making decisions. Those who cannot make such a distinction are either a nuisance, if they think everything is of a policy making nature and do not decide anything for themselves; or are a potential source of trouble, if they think most everything is just an operating problem and nothing is of sufficient importance to be discussed outside of their own offices. There are others, of course, those who make the wrong decision as to what should or should not be considered as operation problems. Most people, being human, are a composite of all three situations and the training of personnel in this respect is a continual problem.

AUDIT OF PRACTICES AND POLICIES

A decentralized operation also requires an audit function and I do not refer just to an audit of the financial records and accounts. An audit of the records and accounts is very obviously necessary but audits should be carried on in other respects also. Personnel policies may be established for the guidance of personnel directors of various branches or divisions but that is not enough; there should be a periodic review and audit of the personnel practices in effect to determine if the decentralized employment, transfer, or release of personnel is proceeding in accordance with the established policies.

The purchasing of materials, supplies and equipment may be decentralized and located in the specific units requiring large amounts of certain classes of supply items such as food, medical supplies, etc. If this is done, it is very essential that the purchasing policies and procedures be written down for the guidance of all units, and that there be a periodic audit of the operations of these units to determine that established policies are being followed.

If a decentralized operation procedure is to be followed, there must be no difficulty in communication among the various offices. In any decentralized operating situation which is to proceed effectively, a coordination of the efforts of the various offices must be obtained and maintained. Some of the points already mentioned are aspects of the coordination process; for example, the use of policy and procedure manuals and the use of auditors on various activities. The use of periodic reports, daily statement of cash, weekly statements of food cost, monthly statements of income and expense, and others are another means of maintaining a clear line of communication between and among various offices within the same organization.

So far, I have discussed certain basic principles of organization in more or less of an impersonal manner; the need to establish the purpose of the organization, the need to departmentalize the organization, the need for flexibility in an organization, the need to relate each unit to other units, the question of centralization of activity versus decentralization. And while it is worthwhile to establish organization principles without giving consideration to the personnel involved, it is always well to remember that organizations are built with and around people. The principles of administration are in most instances principles which relate to the effective management of the people in the enterprise.

MANAGEMENT OF PEOPLE

If the personnel of an organization are to be most effective in their work, the incentives for efficient and effective work must be clearly set forth. And I suppose we might as well recognize that the rewards for inefficient and careless work should also be clear to all concerned. Incentives differ with different organizations and with different positions within an organization. We all are familiar with the incentive of the door-to-door salesman working on a commission based on sales but in many organizations, such as yours for example, the relationship between effort and skill and salary received does not exist to such a direct

extent. In such situations, there is all the more reason that the personnel are informed concerning the objective of the enterprise, the objective of their own group, and the specific objective of each individual within the groups. Clear cut objectives are incentives in themselves and the attainment of these objectives is a satisfying experience.

It is not only for the good of the individual employee that objectives should be clearly established; only in this way can supervisory personnel measure the performance of the personnel being supervised. In the administration of any activity, let us be sure therefore that the people working in the activity know precisely their goals, the rewards for careful as well as careless work, and what we as administrators expect of them.

DELEGATION OF AUTHORITY AND RESPONSIBILITY

In the proper administration of an organization, there must be a delegation of authority to get the work done. Along with this delegation of authority, of course, goes the responsibility that the work is done. The organization chart is an effective means of showing who may be responsible for what, but the actual placing of the responsibility in someone's hands for certain operations can only be accomplished by doing it. It is quite unfair to an individual to hold him responsible without delegating to him sufficient authority to accomplish those areas of work for which he is being held responsible.

FLOW CHARTS

A few minutes ago I spoke about organization charts as a means of establishing the relationships of various units within a larger organization. In the administration of an organization it is often helpful to supplement organization charts with so-called flow charts which show how the work of an organization proceeds from unit to unit, from desk to desk, or from one office to another. A flow chart can be built up on the basis of the forms used, that is, by showing the movement of each form, its purpose, how it is used, its final resting place. Or it can be built up around positions, by showing what each position does in a given flow of work. In purchasing, for example, flow charts may be constructed by taking the forms used and describing how each form fits into the complete cycle of requisitioning, ordering, receiving, and finally paying for a purchase. Or a flow of work may be shown by describing the work of the buyers, the order typists, the traffic clerks, etc. These flow charts are useful in many ways, they point out to individuals and to groups their particular function in what may seem like a long and often times unrelated series of activities, they point out possible bottlenecks or weak spots in the work load, they are informative to new employees, they are a base from which to work when changes are needed because of shifts in the kind of work done or the amount of work done.

One of the dangers, of course, in the use of flow charts and organization charts; in the establishment of specific objectives; and in such other factors in good organization practices is that employees forget to think about their work. When everything is well oiled and well supervised, your people may go on day after day carrying out their activities and responsibilities in the same way. This is a deadening situation. I realize that there can't be turmoil all the time, or change all the time, but there should always be encouragement given to every employee to think about his work while he is doing it, can it be done easier or more effectively? Let us not be, at least while we are at work, like the absent-minded professor, on emeritus status of course, who discovered when he arrived home that he had left his house key at the office. He rapped on the door and his servant, intending to have some fun with the old gentleman, leaned out a second floor window and said, "The professor is not home." Whereupon the professor replied, "Very well, tell him I'll call again later."

I think I have taken enough of your time this morning talking about principles of organization and administration. A good share of this subject is, like many other things in life, just good common sense with special emphasis placed on the individuals who make up the organization. The individuals in your organization should be encouraged to think out their own problems, they should be encouraged to understand more than just their own particular job; they should be encouraged to work as a team with a common goal.

In closing I would like to repeat the need for flexibility of thought on these subjects, the need for an open and inquiring mind on your part, the need to develop personnel who will think about their work as well as do it. I would also like to warn you about attempting to use a Procrustes bed for all situations. You may remember that Procrustes was the legendary Greek highwayman who had an iron bed of certain length beside the road. When anyone came along, he placed the traveler on the bed; if the traveler were too long, Procrustes cut off his legs; if he were too short, he stretched him until he fit. Too often I think we try to force our people and their activities into a set mold or procedure without giving them encouragement and opportunity to develop better ways of doing things.

THERAPEUTIC TRENDS

New trends in medicine and pharmacy include XYLOCAINE—CORTISONE EYE DROPS—TAPAZOL—PABA IN RHEUMATIC FEVER—BACITRACIN IN AMEBIASIS

XYLOCAINE AS LOCAL ANESTHETIC

Xylocaine, described as a new potent and relatively nontoxic anesthetic agent for use in surgery, obstetrics and therapeutics, is being studied at the Johns Hopkins Hospital, Baltimore. Results of the preliminary tests, including a brief history of the development of local anesthetics and technics, appears in *Current Researches in Analgesia and Anesthesia* **29**:136 (May-June) 1950.

Testing a series of seven new local anesthetics, Xylocaine was the most promising, approaching in efficiency the nerve blocking properties of Metycaine, and in toxicity, the advantages of safety presented by procaine. In the clinical trials, Xylocaine was used in local block, caudal and continuous caudal, spinal and continual spinal, peridural and continuous peridural, saddle-block, as a hypospray, for topical use, for intravenous administration and in dentistry—all with favorable results. The strength of solutions varied from 0.5 to 2 per cent Xylocaine.

In summary, the authors outline the following advantages and disadvantages of Xylocaine as a local anesthetic agent.

The advantages are:

1. Stability. The stability of Xylocaine in water solution is greater than that of any other known local anesthetic.

2. Rapidity of action—generally produces anesthesia in a shorter time than other commonly employed local anesthetic agents.

3. Longer duration.

4. Profoundness of anesthesia. It is greater than that provided by the commonly employed anesthetic agents.

5. Low relative toxicity.

6. Low incidence of local and general side effects.

7. Surface anesthetic agent as well as injection agent.

The disadvantages of Xylocaine are:

1. Occasional muscle twitching and/or tremor. The instances of this reaction have decreased since the routine use of epinephrine was discontinued. The authors encountered no serious complications or reactions in using this drug in all of the commonly employed anesthetic technics in use today over a period of more than 12 months.

2. Nausea and vomiting. Occurrence of these symptoms is likewise uncommon and was never severe enough to necessitate discontinuing the use of Xylocaine.

CORTISONE IN OPHTHALMIC DISEASES

Preliminary studies on the use of cortisone (11-dehydro-17-hydroxy-corticosterone) to treat intra-ocular inflammation lesions allied to arthritis are reported in *Proc. Staff Meet., Mayo Clinic* **25**:459 (August 2) 1950. Favorable results were apparent when the drug was administered to four patients suffering from some intra-ocular inflammation associated with arthritis. Further studies were also carried out using cortisone to treat ocular diseases not associated with arthritis; however, further investigational studies will be necessary to determine the value of this drug in treating ocular inflammations in this group.

In these studies cortisone was administered in the form of a suspension of cortisone acetate (Merck).

In one experimental case cortisone was used prior to, during, and after an intra-ocular surgical procedure without causing marked exacerbation of the uveitis and damage to the visual acuity. Heretofore, surgical intervention has been avoided in cases of uveitis until the disease had been quiescent for a period of three to six months.

Summarizing the results of cortisone in the management of intra-ocular lesions allied to arthritis, the authors state that they are of the opinion that the hormone has a beneficial effect if administered before irreversible changes such as atrophy of the iris and complicated cataract have occurred in the affected eye. The earlier the hormone is administered in the course of the ocular disease the more rapid and spectacular the results seem to be. Relapses are the rule but to date, all have been controlled by readministration of cortisone.

Urokon Sodium Brand of Sodium Acetrizoate

1 Low Toxicity
2 Few Side Reactions
3 High Quality Pyelograms
4 Quick Pictures
5 Economical
6 Immediately Available

Urokon is immediately available in convenient packages of one, five and twenty ampuls of 25 cc each.

—a new Contrast medium for Urography by

Mallinckrodt®

May we send you reprints of published clinical reports and other data concerning the above points? Mail the coupon.

MALLINCKRODT CHEMICAL WORKS • ST. LOUIS • NEW YORK
Chicago • Cincinnati • Cleveland • Los Angeles • Philadelphia • San Francisco • Montreal • Toronto

Mallinckrodt Chemical Works
Second & Mallinckrodt Sts., St. Louis 7, Mo.
or
72 Gold Street, New York 8, N. Y.

Gentlemen: Please send me full information and clinical reports on Urokon Sodium.

NAME _____ M.D.

STREET _____

CITY _____ STATE _____

AMP-O-VAC... another basic Fenwal "first"

The equivalent of a *Reusable Ampule*, this newest of Fenwal Containers has gained overnight popularity by virtue of its ability to reduce the waste of novocaine and similar medications by permitting withdrawals, as required, without exposing the balance of contents to air.

AMP-O-VAC Containers — available in 75 ml. size only — and hermetic closures especially designed for puncture-sealing withdrawals, may be repeatedly sterilized and reused as often as required. Saves time . . . Saves medication . . . Saves money.

HEADQUARTERS FOR SCIENTIFIC GLASS BLOWING, LABORATORY AND CLINICAL RESEARCH APPARATUS, REAGENT CHEMICALS

HOSPITAL PHARMACISTS should investigate the economic possibilities of Fenwal . . . Standardized equipment and technics which cover every phase of I.V. therapy; sterile water procedure; preparation of antibiotics in solution.

ORDER TODAY or write for detailed information

MACALASTER BICKNELL COMPANY
243 Broadway Cambridge 39, Massachusetts

TAPAZOL

Tapazol, (Lilly) is a new antithyroid drug which has been found as efficient as thiouracil and propylthiouracil. Comparative studies place the action of Tapazol above that of thiouracil, methylthiouracil, propylthiouracil and 2-mercapto-imidazole, and rate its potency at a hundred times that of thiouracil. According to the report appearing in the *J. Am. Med. Assoc.* **143**:1407 (August 19) 1950, Tapazol appears to be twenty to fifty times as powerful as thiouracil and acts best when administered in doses of 2 to 5 mg. every eight hours. Toxic reactions were not observed on administration of Tapazol; however, the authors point out that more time and treatment of a larger number of patients will be required.

Chemically, Tapazol is 1-methyl-2-mercapto-imidazole. It is one of the imidazoles, differing from the well known antithyroid drugs in that it has a five-membered rather than a six-membered ring.

Eighteen patients with hyperthyroidism were treated with Tapazol of which three with toxic diffuse goiter attained remission in approximately eight weeks. Two of these patients had been given 2 mg. of the drug every eight hours and one patient 5 mg. every twelve hours. Three patients with toxic adenoma reached remission in five to six weeks on a dosage of 2 mg. of the drug every eight hours in the first, 5 mg. every twelve hours in the second and 2 mg. every twelve hours in the third. Symptoms of ten patients under treatment with propylthiouracil continued under control when one mg. of the new compound was substituted for each 25 mg. of the old. Two patients in mild relapse were readily controlled with 2 mg. of the new agent given every twelve hours for seven to eight weeks.

PABA IN RHEUMATIC FEVER

Simultaneous administration of *para*-aminobenzoic acid (Paba), along with the salicylates, in the treatment of rheumatic fever resulted in an increase in blood level of the salicylates, according to a case reported in *Am. J. Med.* **9**:272 (August) 1950. Since a high blood level of salicylates is believed to produce optimum results in the treatment of acute rheumatic fever, Paba may be effective in bringing about a beneficial action in the disease process of rheumatic fever. Therefore, when response to salicylates is unsatisfactory, a patient with rheumatic fever should receive Paba in addition. Beneficial effect should be manifested by the disappearance of symptoms and fever.

This study reports one case of rheumatic fever with refractoriness to 10 Gm. of aspirin daily, manifested by an uninterrupted fever for five weeks which showed dramatic improvement after the additional of Paba in a dose of 24 Gm. daily.

BACITRACIN TO TREAT AMEBIASIS

Results of a study using bacitracin to treat 51 patients with amebiasis are published in *Am. J. Trop. Med.* **30**:491 (July) 1950. The cases varied in severity from asymptomatic to fulminating dysentery. Tablets were administered orally in total daily doses varying from 40 to 20,000 units and treatment extended for from 5 to 20 days. Thirteen patients were asymptomatic, 30 were mildly symptomatic and the remaining 8 were moderately or serious ill requiring hospital care. The results reported are limited to the eight moderately or seriously ill patients with severe amebic dysentery and objective mucosal evidence of active disease. In all individuals, the oral administration of bacitracin was accompanied by striking clinical improvement, control of dysentery within a few days, disappearance of amebae from the stools and surface lesions, and complete healing in from four to fourteen days.

In one case, clinical and parasite relapse occurred eight months after therapy and in three additional patients, parasite relapse occurred without clinical activity or evidence of disease 5, 18 and 350 days after therapy. In one severe case, bacitracin was effective after other amebicidal drugs and antibiotics, including Aureomycin, failed to terminate the infection. Of 43 mildly symptomatic or asymptomatic patients who received one or more courses of bacitracin, apparent cures resulted in 80 per cent. The recommended dose is 80,000 units daily for 10 days. Toxicity from oral administration is negligible.

In the study, Aureomycin was also among the antibiotics used to treat dysentery. It was found effective in eliminating amebic infection in 31 of 32 mildly symptomatic or asymptomatic cases of amebiasis. In one of the latter, parasite relapse occurred 15 days after completion of therapy. In one severe case of amebic dysentery, 23.25 Gm. of Aureomycin given during nine days failed to terminate the clinical attack or eliminate *E. histolytica*. At the present stage of the follow-up observation the authors reported the cure rate at 93 per cent. Approximately 20 per cent of patients who received 2.0 Gm. or more of the drug daily had nausea and vomiting. At present 2.0 Gm. daily for 10 days is the recommended dosage.

In conclusion the authors state that it is believed that the use of these antibiotics alone or in combination with other amebicidal drugs should materially influence the probability of cure in any given case of intestinal amebiasis.

TIMELY DRUGS

ARTISONE ACETATE INJECTION . . . (Prebediolone Acetate, 21 acetoxy-pregnenolone), has been introduced by Wyeth Incorporated to alleviate the local effects of rheumatoid arthritis. In extensive clinical trials, Artisone has shown most promise for patients with mild to severe afebrile rheumatoid arthritis of less than ten years' duration (particularly in females 20 to 40 years old) and for stiffness of muscles and tendons. Apparently nontoxic, Artisone produces no undesirable effects on metabolism and endocrine function. It is supplied in 10 cc ampuls containing 100 mg. per cc.

* * *

CELLOTHYL . . . is a preparation of methylcellulose available from Chilcott Laboratories, Division of Maltine Company, Morris Plains, N.J. Effective in treating constipation and diarrhea, Cellothyl is convenient and pleasant to take.

* * *

CHLOROMYCETIN . . . (chloramphenicol, Parke, Davis) is now available in 50 mg. capsules, providing a dosage especially suited to pediatric practice. It is easily administered to children, or contents easily removed into masking vehicles. The 50 mg. capsules of Chloromycetin are available in vials containing 25 capsules.

* * *

CHLOROMYCETIN KAPSEALS . . . (Parke, Davis) are now available in bottles of 100 as well as in packages of 16.

* * *

CHLOR-TRIMETON MALEATE SYRUP . . . for use in adjunctive therapy in all allergic conditions responding to antihistamine therapy, is available from Schering Corporation. It inhibits the histamine effects produced by allergens and is therefore indicated in hay fever, vasomotor rhinitis, urticaria, gastrointestinal allergies, drug reactions and other allergic manifestations. Because of its high potency, it is indicated in many out-of-the ordinary cases such as tuberculous reactions, transfusion and serum reactions, insect bites, measles, chicken pox and other exanthematous eruptions which respond with the same lack of side actions.

CORAMINE . . . is now available from Ciba Pharmaceutical Products, Inc. in 20 cc. multiple dose vials, with rubber diaphragm closure. This new size is supplied to facilitate administration of Coramine in the large doses now recommended in shock and barbiturate poisoning.

* * *

KUTROL . . . (uroenterone, Parke, Davis) is an extract of pregnancy urine, also known as anthelone. It has been found effective in the treatment of crateriform duodenal ulcers. It does not inhibit gastric secretions when given by oral route. The usual dosage is two Kapseals four times daily. Kutrol can be expected to induce remission of the ulcer within a period of three to six weeks. Kutrol Kapseals, 75 mg., are supplied in bottles of 100.

* * *

MINACAP CAPSULES . . . (Upjohn) are a mixture of the essential fat and water-soluble vitamins, with minerals for use in conditions where increased demand for these factors exists. The inclusion of vitamin B_{12} and folic acid with the other B complex factors plus vitamins A, D and C, iron, calcium and phosphates provide a well balanced formula. The adult dose is three or more capsules daily. Minacaps are supplied in bottles of 100 and 50 capsules by The Upjohn Company.

* * *

ORYGENE . . . (Parke, Davis) is a chewing troche containing 10,000 units of crystalline potassium penicillin-G in each. It is prepared with a chicle chewing gum base and therefore resembles popular chewing gum in consistency and flavor. Orygene is used in the prophylaxis and treatment of Vincent's infection, gingivitis, secondarily infected cankers, and other infections of the mouth and throat. It may also be used for preventing secondary infections following tonsillectomy, tooth extraction, and other surgical procedures. Orygene is supplied in convenient packages of 12 chewing troches, peppermint-flavored, each individually hermetically sealed in aluminum foil.

PENICILLIN S-R WITH DIHYDROSTREPTOMYCIN . . . is a combination of soluble and repository types of penicillin, together with dihydrostreptomycin, a derivative of streptomycin possessing substantially the same antibacterial properties and somewhat lower toxicity than the parent drug. Each four cc. of the preparation with aqueous diluent contains: crystalline procaine penicillin-G, 300,000 units; crystalline sodium penicillin-G, 100,000 units; and dihydrostreptomycin (as the sulfate), 1 Gm.

This combination is indicated in the treatment of infections due to gram-positive and gram-negative organisms; and particularly useful where mixed infections are involved, such as subacute bacterial endocarditis, urinary tract infections; and in the preparation and protection of surgical sites.

Penicillin S-R with Dihydrostreptomycin is supplied by Parke, Davis and Co. in single-dose sterile rubber-diaphragm-capped drain-free vials in individual cartons. The contents of each rubber-diaphragm-capped drain-free vial, when diluted with 3.3 cc. of aqueous diluent, provides a single dose containing: 300,000 units crystalline procaine penicillin-G; 100,000 units crystalline sodium penicillin-G; and 1.0 Gm. dihydrostreptomycin (as the sulfate).

* * *

STREPTOPAS . . . is a combination of dihydrostreptomycin and sodium *para*-aminosalicylate, available *for investigational use only* from Paramino Corporation, 162 East 86th St., New York 28. Recent clinical studies indicate that this combination of chemotherapeutic agents may be effective in treating some forms of tuberculosis. Streptopas is available in ampuls containing 250 mg. of dihydrostreptomycin per 2 Gm. of sodium *para*-aminosalicylate or 50 mg. of dihydrostreptomycin per 4 Gm. of sodium *para*-aminosalicylate.

* * *

TRAVERT . . . is the name given to a preparation of invert sugar for parenteral therapy. It is supplied by Baxter Laboratories, Inc., Morton Grove, Ill. Since dextrose is utilized slowly following intravenous administration, complete parenteral carbohydrate alimentation is difficult and impractical, requiring hours to carry out the required infusion. Introduction of invert sugar into therapeutics offers a substance which is more rapidly assimilated than is dextrose, and therefore a more satisfactory substance for supplying carbohydrates parenterally. According to the clinical reports ten per cent Travert solution may be administered over the same time interval as may five per cent dextrose solution, with only twice as much excreted in the urine in most cases. It therefore makes possible the administration of high caloric infusions in the shortest possible time, with minimal discomfort and greater convenience to the patient and requiring the least amount of supervisory care.

Travert is prepared by the hydrolysis of sucrose, and is composed of equal parts of *d*-glucose (dextrose) and *d*-fructose (levulose). This sterile, crystal clear, colorless, nonpyrogenic and nonanaphylactogenic solution is stable and may be stored at room temperature.

* * *

TERRABON . . . is a preparation of terramycin supplied by Chas. Pfizer and Co., Inc. Recent clinical reports have shown that Terramycin is effective against a wide range of diseases including bacterial and "virus" pneumonia; acute streptococcal infections; including erysipelas, septic sore throat, and tonsillitis; acute staphlococcal infections; anthrax; certain urinary tract infections; venereal infections; typhus, rickettsial pox; undulant fever, amoebic dysentery and others. Terrabon is supplied in a combination package which consists of (1) a vial containing 1.5 Gm. of Terramycin, and (2) a bottle containing 1 fluid oz. of a specially flavored and buffered diluent. When compounded, the Terramycin elixir can be stored for at least two weeks at room temperature without appreciable loss of potency. Terramycin itself, at room temperature, maintains its potency for at least one year.

* * *

TERRAMYCIN INTRAVENOUS . . . is an injectable form of Terramycin available from Chas. Pfizer and Co., Inc. The intravenous form of the drug will be used for treatment where immediate therapeutic action is essential. It will be useful in the treatment of hospitalized patients who cannot take the customary forms of oral antibiotic medication. The outstanding uses for which Terramycin Intravenous is indicated are treatment of peritonitis and prophylactic sterilization of the intestine before and after abdominal surgery. Clinical studies have shown Terramycin to be effective against a wide range of pathogenic organisms in the bacterial, rickettsial, and protozoan groups, and against certain of the viral-like infections. Terramycin Intravenous is available in 250 mg. or 500 mg. vials.

ANSWERS TO QUERIES

Edited by EVLYN GRAY SCOTT, *St. Luke's Hospital, Cleveland*

PENICILLIN AND STREPTOMYCIN IN THE SAME SYRINGE

Is the administration of mixtures of penicillin and streptomycin good therapy? If not mixed in one vial, can these two antibiotics be taken up in the same syringe immediately before administration?

ANSWER.—In the *Journal of the American Medical Association* for January 22, 1949, page 272, column 2, this question was answered as follows: "Penicillin and streptomycin may be given together in the same syringe. Solutions containing the two antibiotics should not be kept for more than a few hours, since the acid salts of streptomycin may tend to inactivate the basic salts of penicillin. This would not occur rapidly, so that such mixtures would probably be stable for several hours."

VOLATILE DEODORANT

A query was answered concerning a volatile deodorant in THE BULLETIN of January-February, 1948, page 34. This formula has now been modified with more effective results. The modification was supplied by Gabriel Brown, State Hospital, Cleveland, Ohio.

Neutroleum Alpha	10%
Wetting Agent*	(to saturate solution)
Triethanolamine	1%
Isopropanol 99%, to make	100%

*Sodium lauryl sulfate may be used; about 0.1 per cent or less. Sodium lauryl sulfate is a suitable wetting agent and may be obtained from E. I. du Pont de Nemours and Company under the trade name of Duponol C. Small quantities may be obtained from the Frank Kerr Company, 961 Porter Street, Detroit, Michigan. A similar commercial type of wetting agent would be the household product, Dreft.

Neutroleum Alpha is a product of Fritzche Brothers, Inc., 76 Ninth Avenue, New York 11, N.Y.

DEXTROSE C.P.

Why use Dextrose C.P. grade in preference to U.S.P. grade for the preparation of parenteral solutions?

ANSWER.—In our experience (and information obtained from others by personal communication) anhydrous C.P. Dextrose consistently gives a solution more nearly colorless than hydrous Dextrose U.S.P.

STERILIZATION OF DISHES

Is there an effective cold sterilization solution for disinfection of dishes and silverware for tuberculous patients? Will aqueous solutions of Zephiran Chloride effectively kill the T.B. bacillus?

ANSWER.—In *Aseptic Treatment of Wounds* by Dr. Carl W. Walter under the subject "Control of Communicable Disease" the author states: "Dishes are most readily disposed of by loading them into a dish sterilizer to which sufficient detergent is added so that the dishes are cleansed while they are boiled for fifteen minutes. . . . When efficient detergents are used, almost all bacteria are removed by the dish water and the dishes are left clean, whereas disinfection of incompletely washed dishes, either by a rinse in germicide or exposure to ultraviolet radiation is ineffective. . . . The maintenance of a good detergent solution at a minimum of *p*H of 10.5 is essential. The solution must be clean and should have a temperature about 50 degrees C. Rinsing in clean water at 80 degrees C. is sufficient to turn out sanitized tableware."

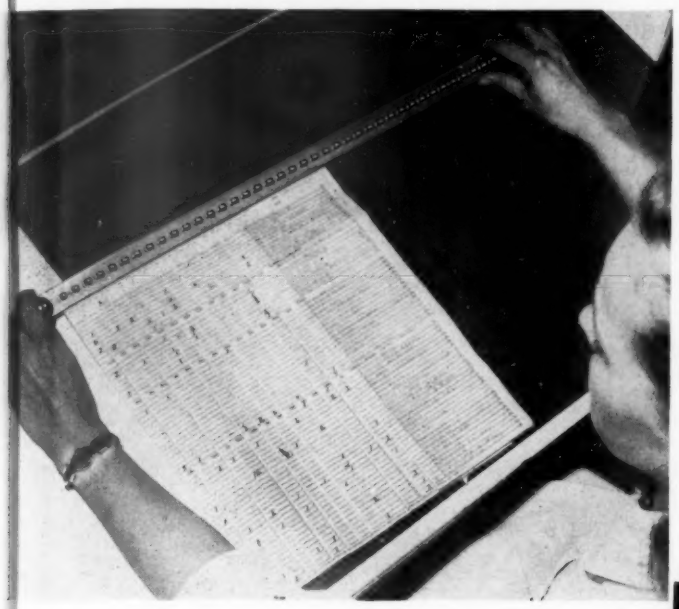
In *The Journal of the American Hospital Association*, January 1950, Margaret Gillam in her article "Minimum Dishwashing Standards Suggested for Hospitals" states: "When hot water is used for bactericidal treatment, a hot water heater capable of maintaining a water temperature of at least 170 degrees F. in the vat should be provided at all times. Detergent-sanitizers alone do not do a satisfactory job of sanitizing, but followed with a sanitizer rinse is a good method for obtaining good results."

SMALL DROPPER BOTTLE

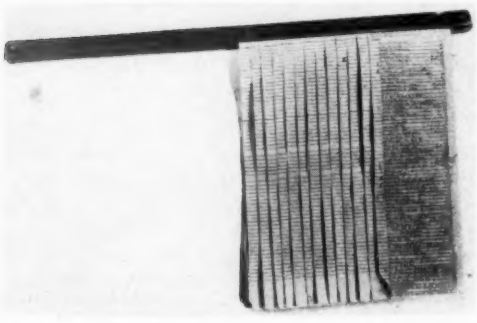
C. A. C. of Kansas wants to know where to obtain the small 5 cc. clear glass square bottles with plastic stoppers and droppers attached which may be used in the eye clinic and on the ward for eye solutions.

ANSWER.—These bottles may be ordered from the Pennsylvania Glass Products Co., Pittsburgh, Pa. The bottle is designated as a 1/8-ounce crystal square. The price is approximately $8.00 a gross.

ASSEMBLY RAIL

Is there a simple method that can be used to determine the total amount of floor stock material requisitioned by the individual floors from the pharmacy?

The forms may be folded through the center and tabulated with the aid of a blank form on the right.

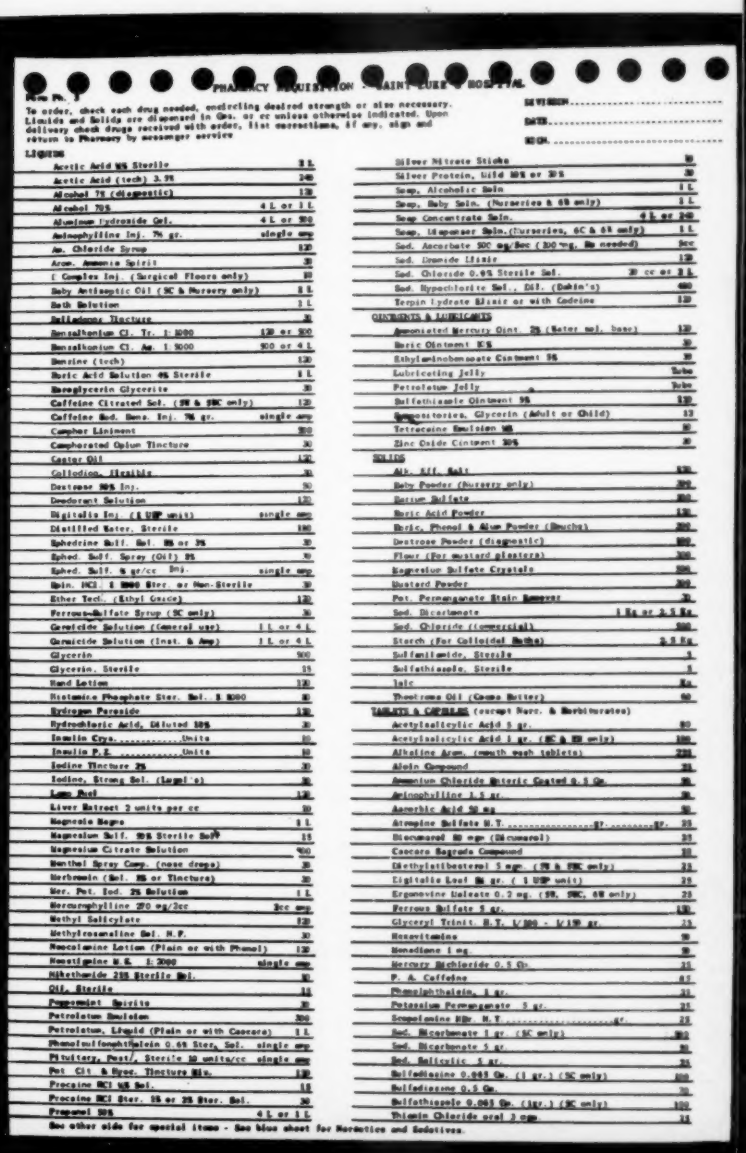
The floor stock sheets must be punched to align with the posts of the assembly rail.



The assembly rail has been turned over to tabulate the reverse side of the requisition form.

ANSWER.—The total amount of floor stock requisitioned by the individual floors may be determined by the use of printed sheets. These may be aligned for tabulation with an assembly rail consisting of two 22 inch bars, the upper bar having 40 holes into which the posts along the lower bar fit to hold the punched forms in place. The bars are locked together by end clips. The assembly rail (U.A.–5 Assembly Rail) may be purchased from the McBee Company, Athens, Ohio for $12.91 plus postage.

There is a definite relation between the location of the holes and the columns for tabulation on the forms. The tabulating columns must be either on the outside edge or directly next to a fold if two columns are used. Both sides of a sheet may be used. The width of the column for tabulation should be the same as that from the center of one post to the center of the adjoining post. Any binding company should be able to punch the holes in the forms at a reasonable price.



PHARMACY REQUISITION - SAINT LUKE'S HOSPITAL

Form No. 3

To order, check each drug needed, encircling desired strength or size necessary. Liquids and Solids are dispensed in Gms. or cc unless otherwise indicated. Upon delivery check drugs received with order, list corrections, if any, sign and return to Pharmacy by messenger service

LIQUIDS	
Acetic Acid 4% Sterile	8 L
Acetic Acid (tech) 3.5%	240
Alcohol 7% (disposable)	120
Alcohol 70%	4 L or 1 L
Aluminum Hydroxide Gel.	4 L or 500
Aminophylline Inj. 7½ gr.	single amp
Am. Chloride Syrup	120
Arom. Ammonia Spirit	8
C Complex Inj. (Surgical Floors only)	80
Baby Antiseptic Oil (SC & Nursery only)	8 L
Bath Solution	1 L
Belladonna Tincture	8
Benzalkonium Cl. Tr. 1:1000	120 or 500
Benzalkonium Cl. Aq. 1:1000	900 or 4 L
Benzine (tech)	120
Boric Acid Solution 4% Sterile	8 L
Buroglycerin Glycerite	8
Caffeine Citrated Sol. (SW & SHC only)	120
Caffeine Sod. Benz. Inj. 7½ gr.	single amp
Camphor Liniment	500
Camphorated Opium Tincture	8
Castor Oil	120
Collodion, Flexible	8
Dextrose 50% Inj.	80
Deodorant Solution	120
Digitalis Inj. (1 USP unit)	single amp
Distilled Water, Sterile	180
Ephedrine Sulf. Sol. 1% or 3%	8
Ephed. Sulf. Spray (Oil) 2%	8
Ephed. Sulf. 4 gr/cc Inj.	single amp
Epin. HCl. 1:1000 Ster. or Non-Sterile	8
Ether Tech. (Ethyl Grade)	120
Ferrous Sulfate Syrup (SC only)	8
Germicide Solution (General use)	1 L or 4 L
Germicide Solution (Inst. & Amp)	1 L or 4 L
Glycerin	500
Glycerin, Sterile	15
Hand Lotion	120
Histamine Phosphate Ster. Sol. 1:1000	8
Hydrogen Peroxide	120
Hydrochloric Acid, Diluted 10%	8
Insulin Crys. .....Units	80
Insulin P.Z. .....Units	80
Iodine Tincture 2%	8
Iodine, Strong Sol. (Lugol's)	8
Lens Fluid	120
Liver Extract 2 units per cc	80
Magnesia Magma	1 L
Magnesium Sulf. 25% Sterile Soln	15
Magnesium Citrate Solution	500
Menthol Spray Comp. (nose drops)	8
Merbromin (Sol. 2% or Tincture)	8
Mer. Pot. Iod. 2% Solution	1 L
Mercurophylline 200 mg/2cc	2cc amp
Methyl Salicylate	120
Methylrosaniline Sol. N.F.	8
Nantaine Lotion (Plain or with Phenol)	120
Neostigmine U.S. 1:2000	single amp
Nitrathoide 25% Sterile Sol.	8
Oil, Sterile	15
Peppermint Spirits	8
Petrolatum Emulsion	200
Petrolatum, Liquid (Plain or with Cascara)	1 L
Phenolsulfonphthalein 0.06 Ster. Sol.	single amp
Pituitary, Post/, Sterile 10 units/cc	single amp
Pot. Cit. & Hyos. Tincture 10%	120
Procaine HCl 5% Sol.	15
Procaine HCl Ster. 1% or 2% Ster. Sol.	30
Propanol 50%	4 L or 1 L

Silver Nitrate Sticks	8
Silver Protein, Mild 10% or 20%	8
Soap, Alcoholic Soln	1 L
Soap, Baby Soln. (Nurseries & OB only)	1 L
Soap Concentrate Soln.	4 L or 240
Soap, Dispenser Soln.(Nurseries, SC & OB only)	1 L
Sod. Ascorbate 500 mg/5cc (200 mg. Rx needed)	5cc
Sod. Bromide Elixir	120
Sod. Chloride 0.9% Sterile Sol.	30 cc or 2 L
Sod. Hypochlorite Sol., Dil. (Dakin's)	480
Terpin Hydrate Elixir or with Codeine	120
OINTMENTS & LUBRICANTS	
Ammoniated Mercury Oint. 2% (Water sol. base)	120
Boric Ointment 3½%	8
Ethylaminobenzoate Ointment 5%	8
Lubricating Jelly	Tube
Petrolatum Jelly	Tube
Sulfathiazole Ointment 5%	120
Suppositories, Glycerin (Adult or Child)	12
Tetracaine Emulsion 1%	8
Zinc Oxide Ointment 20%	8
SOLIDS	
Alk. Eff. Salt	120
Baby Powder (Nursery only)	200
Barium Sulfate	200
Boric Acid Powder	120
Boric, Phenol & Alum Powder (Douche)	200
Dextrose Powder (diagnostic)	100
Flour (For mustard plasters)	500
Magnesium Sulfate Crystals	500
Mustard Powder	200
Pot. Permanganate Stain Remover	8
Sod. Bicarbonate	1 Kg or 2.5 Kg
Sod. Chloride (Commercial)	500
Starch (For Colloidal Baths)	2.5 Kg
Sulfanilamide, Sterile	1
Sulfathiazole, Sterile	1
Talc	1 Kg
Theobroma Oil (Cocoa Butter)	60
TABLETS & CAPSULES (except Narc. & Barbiturates)	
Acetylsalicylic Acid 5 gr.	80
Acetylsalicylic Acid 1 gr. (SC & NB only)	100
Alkaline Arom. (mouth wash tablets)	250
Alvin Compound	25
Ammonium Chloride Enteric Coated 0.5 Gm.	25
Aminophylline 1.5 gr.	8
Ascorbic Acid 50 mg	50
Atropine Sulfate 0.7	25
Bicarbonated Mg cpd (Dicarbonyl)	25
Cascara Sagrada Compound	25
Diethylstilbesterol 5 mgr. (SW & SHC only)	25
Digitalis Leaf 1½ gr. (1 USP unit)	25
Ergonovine Maleate 0.2 mg. (SW, SHC, OB only)	25
Ferrous Sulfate 5 gr.	120
Glyceryl Trinit. N.F. 1/100 - 1/150 gr.	25
Hexavitamins	50
Hexedrine 1 mg	50
Mercury Bichloride 0.5 Gr.	25
P. A. Caffeine	25
Phenolphthalein, 1 gr.	25
Potassium Permanganate 5 gr.	25
Scopolamine HBr N.F.	25
Sod. Bicarbonate 1 gr. (SC only)	200
Sod. Bicarbonate 5 gr.	25
Sod. Salicylic 5 gr.	25
Sulfadiazine 0.065 Gr. (1 gr.) (SC only)	200
Sulfadiazine 0.5 Gr.	25
Sulfathiazole 0.065 Gr. (1gr.) (SC only)	100
Thiamin Chloride oral 2 mg	25

See other side for special items - See blue sheet for Narcotics and Sedatives.

NOTES AND SUGGESTIONS

Edited by GEORGE L. PHILLIPS, *University Hospital, Ann Arbor, Michigan*

A selected number of the formulas which were presented at the Sixth Institute on Hospital Pharmacy in June are presented here for the benefit of those who were unable to attend the Institute.

***NEO-ANTERGAN SYRUP, 2.5 mg./cc.**

Oil of Lemon, terpeneless	0.5 cc.
Benzaldehyde	0.5 cc.
Pyranisamine Maleate (Neo-Antergan)	10.0 Gm.
Cane Sugar, granulated	3080.0 Gm.
Glycerin	400.0 cc.
F. D. and C. Red No. 1, certified dye	0.1 Gm.
Distilled Water, to make	4,000 cc.

Dissolve the sugar in sufficient boiling distilled water to make 3,375 cc. and allow to cool. Dissolve the oil of lemon and the benzaldehyde in the glycerin and stir this solution into the syrup. Dissolve the Neo-Antergan in 125 cc. of distilled water and the red dye in 50 cc. of distilled water and add both to the syrup. Make up to volume with distilled water and stir thoroughly. The syrup is then strained through damp muslin from which the starch has been removed by immersing in boiling water.

ZEPHIRAN GERMICIDAL SOLUTION

Isopropanol, 99%	9,000 cc.
Methanol, technical	720 cc.
Formaldehyde, 37%	1,440 cc.
Zephiran Concentrate, 12.8%	144 cc.
Sodium Nitrite	180 Gm.
Distilled Water, to make	18,000 cc.

Dissolve the sodium nitrite in a mixture of the formaldehyde and Zephiran, plus 6000 cc. of water. Mix the two alcohols and add, with stirring, to the aqueous mixture. Make up to volume with the distilled water.

This product is used in the operating room as a disinfectant for instruments. It has been found to be effective on instruments after three minutes exposure by the Bacteriology Department at the University of Michigan.

* Neo-Antergan is the trade name of Merck and Company for pyranisamine maleate.

MULTIVITAMIN SOLUTION

*Vitamin A & D Blended Mix	6.0 Gm.
*Mixed Tocopherols, Type 4	4.0 Gm.
Thiamin Chloride	1.0 Gm.
Riboflavin	0.5 Gm.
Pyridoxine Hydrochloride	1.0 Gm.
†Panthenol	2.0 Gm.
Niacinamide	8.0 Gm.
Ascorbic Acid	50.0 Gm.
‡Tween 60	70.0 Gm.
Propylene Glycol	90.0 cc.
Distilled Water, to make	600.0 cc.

Mix the Vitamin A & D Mix and the tocopherols thoroughly with the Tween 60. Dissolve the niacinamide in 200 cc. of boiling distilled water, then add the riboflavin and heat until dissolved. Cool to room temperature, add the remaining vitamins, and the propylene glycol. Add the aqueous mixture to the Tween and oils; mix *slowly* with *stirring*. Make up to volume with distilled water. Filter through a Seitz type filter, using a coarse pad similar in grade to an Ertel, No. 2 filter pad. Package in suitable dropper bottles under nitrogen gas.**

DIAPER RASH OINTMENT

Balsam Peru	1.0 Gm.
Castor Oil	1.0 Gm.
Boric Acid Powder	2.0 Gm.
Zinc Oxide	5.0 Gm.
Zinc Stearate	5.0 Gm.
White Petrolatum	86.0 Gm.

Mix the castor oil and balsam of Peru intimately; add this mixture to the petrolatum, mix thor-

* The Vitamin A & D Blended Mix contains in each gram, 833,333 units of vitamin A and 166,666 units of Vitamin B. Mixed Tocopherols, Type 4, contain 40 per cent tocopherols and is added for its sparing action on vitamin A. Each of these preparations are available in the above concentrations from several sources, including Distillation Products Company, Rochester, New York.

† Panthenol, a very stable and compatible form of pantothenic acid is available from Hoffman La Roche, Inc., Nutley, N.J.

‡ Tween 60 is available from the Atlas Powder Company, Wilmington, Delaware.

** Bottles with graduated droppers are available from the Pennsylvania Glass Products Company, Pittsburgh, Pa.

oughly, and add the remaining ingredients. Mix carefully and mill until perfectly smooth.

This preparation is an alkali neutralizing and protective ointment for the alleviation and prevention of diaper rash.

CORTISONE OPHTHALMIC OINTMENT, 1 mg. per. gram

Current interest in the use of Cortisone for ophthalmic purposes led to the development of the following formula. Extremely good absorption has been noted following repeated clinical trials.

Cortisone (alcohol or acetate)	0.250 Gm.
*Polyethylene Glycol 300	50.0 Gm.
*Carbowax 1500	200.0 Gm.

Melt the Carbowax; remove from heat and add the polyethylene glycol and Cortisone. Stir until congealed.

BENZOCAINE ANESTHETIC OINTMENT, 20%

Benzocaine Powder	20.0 Gm.
Polyethylene Glycol 300	30.0 Gm.
*Carbowax 4000	15.0 Gm.
*Carbowax 4000	15.0 Gm.

Rub the Benzocaine into the polyethylene glycol until smooth. Melt the Carbowax 4000 and mix thoroughly with the Carbowax 1500; incorporate, when cool, with the Benzocaine solution and mix thoroughly.

This preparation has a very rapid onset of local anesthesia, especially on mucous membrane or denuded skin and burned areas.

LIQUID VANISHING CREAM

Paraffin	60.0 Gm.
White Beeswax	120.0 Gm.
Liquid Petrolatum	540.0 Gm.
Stearic Acid	10.0 Gm.
Sodium Borate	10.0 Gm.
†Stal Bouquet Bluebell	2.0 cc.
Distilled Water	260.0 cc.

Melt the paraffin, white wax, mineral oil, and stearic acid together and heat to 70° C. Dissolve the borax in the water and heat the solution to 70° C. also. Slowly add the lipoid phase to the aqueous phase with constant stirring. Stir until congealed, then add the perfume, mix thoroughly, and pass through mill.

PATCH TESTING SET

A basic patch test for determination of contact dermatitis, especially of industrial origin, is frequently composed of the following items put up in uniform containers. Probably the most practical containers are ointment jars and dropper bottles. Sometimes this is called the Basic Sulzberger test set.

Butesin Picrate Ointment 1%
Potassium Iodide, 50%, in Petrolatum
Para-phenylenediamine, 2%, in Petrolatum
Benzocaine, 5%, in Petrolatum
Sodium Fluoride, 2%, in Distilled Water
Mercuric Chloride, 1:1,000, Aqueous
Resorcin, 1%, Aqueous
Turpentine, 50%, in Peanut Oil
Quinine Hydrochloride, 1%, Aqueous
Pyrethrum Powder
Linseed Oil
Formalin, 5%, Aqueous
Nickel Chloride, 10%, Aqueous
Copper Sulfate, 1%, Aqueous
Sodium Arsenate, 10%, Aqueous
Potassium Dichromate, 0.5%, Aqueous

LIQUID DERMATOLOGICAL VEHICLE

Isopropyl Alcohol	20.0 cc.
Propylene Glycol	20.0 cc.
*Tween 20	10.0 cc.
Distilled Water	50.0 cc.
Perfume as desired	

Simple mixture.

The above formula was devised to provide the dermatologist with a liquid water soluble vehicle for external application of medicinals to the body. This vehicle is especially valuable in treating diseases of the scalp as it is inconspicuous and easily removed. Many of the commonly used drugs for skin diseases are completely soluble in this vehicle, including benzoic acid, salicylic acid, *beta*-naphthol, chloral hydrate, coal tar solution, menthol, phenol, pilocarpine hydrochloride, resorcin, resorcin monoacetate, and so forth. Sulfur and ammoniated mercury may be suspended in it.

DUPONOL SHAMPOO

For completely soluble synthetic detergent shampoos that show very little of the tendency of sodium lauryl sulfate to precipitate out of solution, especially in cold weather, either of the following Duponol compounds, which are obtainable from the E. I. Du Pont and Company, Inc., Organic Chemicals Department, Wilmington 98, Deleware, may be used.

Duponol WAT contains 35 per cent triethanolamine lauryl sulfate and is 100 per cent soluble and costs $0.30 per pound.

Duponol ST contains 39 per cent triethanolamine lauryl sulfate and is 100 per cent soluble and costs $0.33 per pound.

* The Carbowax 1500 and Polyethylene Glycol 300 may be obtained from the Carbide and Carbon Chemicals Corporation, 30 East 42nd Street, New York 17, N.Y.

† Stal Bouquet Bluebell perfume may be obtained from Magnus, Mabee & Reynard, Inc., 16 Desbrosses Street, New York, 13, N.Y.

as the president sees it

I. THOMAS REAMER
Duke Hospital, Durham, N.C.

In the last issue of THE BULLETIN, I gave my good friend and able pharmacist Grover C. Bowles, our vice-president, the opportunity to express his view-point to our membership. He responded with an interesting page, but reminded me that I had really put him to work as chairman of the Committee on Organization and Membership. I will put more members to work as it becomes necessary to get a job done for hospital pharmacy. Ray E. Brown, superintendent of University Clinics at the University of Chicago, is chairman of the Association of University Programs in Hospital Administration. His group is interested in the development of resource materials for teaching the fundamentals of hospital pharmacy to students of hospital administration. When this request came to me it was not difficult to find members of our Society with proper experience to work on such a project.

John J. Zugich, a former president of our Society, who is now administrative resident in hospital administration at the University Hospital, University of Michigan along with John Miller, administrator, Union Hospital, Dover, Ohio; Hans Hansen, also a former president, but now administrator at Grant Hospital in Chicago; D. O. McClusky, administrator, Druid City Hospital, Tuscaloosa, Ala., along with our capable director, Don Francke, will do the honors on this project.

CIVILIAN DEFENSE

At the present time it seems that the shooting war in Korea will end soon. Even though this does happen, we will still need to be alert during the months ahead for possible out-breaks throughout the world and for sabotage at home. Hospitals are being alerted regarding their responsibility to our citizens in case of disaster. I have appointed a Committee on Civilian Defense with Ludwig Pesa, of St. Mary's Hospital, Passaic, N.J., as chairman to keep us informed regarding the steps which we should take regarding personnel and supplies during the period of this emergency. Other members of the committee are: Anna C. Richards, Mountainside Hospital, Montclair, N.J.; Jerome M. Yalon, University of California Hospital, San Francisco; George F. Archambault, Pharmacy Service, U.S.P.H.S., Washington, D.C.; Norman Baker, New York Hospital, New York City and Albert P. Lauve, Mercy Hospital, New Orleans.

We will be asked to increase our inventory of surgical supplies, antibiotics, materials for the treatment of burns, and blood products. Your abilities and supplies may be needed and will add a great deal to the resources of your community. At the national level, the United States Public Health Service will probably maintain supervision of health activities.

THE DAYS AHEAD

I am planning for a trip to Fontana Dam in North Carolina during the first week of October to attend the meeting of the Southeastern Society of Hospital Pharmacists. When I return I will be looking forward to a new and exciting experience. Gordon Gray will be installed as the new president of the University of North Carolina at Chapel Hill, N.C., The A.Ph.A. was invited to send a representative to the inauguration and Dr. Fischelis has asked me to represent this organization.

In December, I will adress the Baltimore Branch of the A.Ph.A. and the Maryland Association of Hospital Pharmacists.

We are in close contact with officials of the American Hospital Association and plans are being made for our Institute for 1951. The location has not been decided as yet, but the choice at present lies between Durham, New Orleans, and Chicago. The Catholic Hospital Association has already decided on the time and place for their Third Annual Institute which is to take place in Philadelphia, May 31st–June 3rd, 1951.

A.S.H.P. AFFILIATES

The **Association of Hospital Pharmacists of the Midwest** has awarded a one-year gift membership in the A.Ph.A. and the A.S.H.P. to Miss Isabel T. Bogner of Lincoln, Nebraska. The award is made annually by the Midwest Society to a member of the graduating class at University of Nebraska.

Members of the **Western Pennsylvania Society of Hospital Pharmacists** met at the Falk Clinic in Pittsburgh on September 21. Included on the program was a discussion on the handling of narcotics as required by Pennsylvania's State law.

Regular meetings of the **Northern California Society of Hospital Pharmacists** were held throughout the summer months. Principal speaker at the July 11 meeting was Dr. Donald C. Brodie, Associate Professor of Pharmacy, University of California College of Pharmacy. Dr. Brodie congratulated the Society on its excellent progress outlining the following suggestions for further development: (1) That periodic workshops or seminars be held by the Society as a means of improving the standards of professional service rendered by its members; (2) That the individual members of the Society increase the number of contributions to the literature of pharmacy; and (3) That the activities of the Society be coordinated with those of the Northern California Branch of the American Pharmaceutical Association.

Highlighting the August 8 meeting held at Herrick Memorial Hospital in San Francisco, was a lecture on "Atomic Medicine" by Dr. Charles Hudson, Medical Corps, U. S. Army. He traced the development of man's knowledge of atomic energy, the efforts of the United States to develop the atomic bomb and the effects of the different types of radiation from an atomic explosion. Dr. Hudson elaborated on the tolerance of individuals to radiation and discussed some of the drugs used in radiation sickness. He further discussed the role which hospital pharmacists might take in planning for civil defense against atomic attacks.

Fifteen members of the **Hospital Pharmacists Association of Greater St. Louis** met for the first fall meeting on September 12 at the St. Louis College of Pharmacy. Business covered included committee reports, membership activities and plans for National Pharmacy Week. A paper on the cost of hospital medications was presented by Mr. Lyndahl A. Bloome.

The **Wisconsin Society of Hospital Pharmacists** met at the Evangelical Deaconess Hospital, Milwaukee, on September 22 at 3:45 P.M. with Mrs. Doris Shimon as hostess. The guest speaker, Dr. Donald C. Ausman, chairman and secretary of the Wisconsin Chapter of the American Academy of General Practice, spoke on the "Detection of Heart Ailments and High Blood Pressure by the Use of the Flicker Fusion Photometer." Included also on the program were reports on the Institute on Hospital Pharmacy by Mr. Earl Jenson and Miss Patricia Messner.

On the invitation of Mr. Ernest G. Kuenzi, plans were made to hold a state-wide meeting at Madison on November 17.

The July 12 meeting of the **Southern California Chapter of the American Society of Hospital Pharmacists** was held at the Queen of Angels Hospital in Los Angeles. Highlighting the program was a discussion on present day therapy used in treating the anemias by Mr. Douglas Thompson of Lederle Laboratories.

During the business session announcement was made concerning recognition of hospital pharmacy on the United States Pharmacopoeial Revision Committee. Plans were also discussed in regard to the possibility of holding an Institute on Hospital Pharmacy in conjunction with the Western Hospital Association's annual convention.

The Arizona Society of Hospital Pharmacists met at St. Mary's Hospital in Tucson on September 17. Reports were received from members who attended the 1950 Institute on Hospital Pharmacy. Topics for discussion included the Proposed Minimum Standard for Pharmacies in Hospitals; the Pharmacy and Therapeutics Committee; and the establishment of a Formulary.

CURRENT LITERATURE

Edited by SISTER MARY ETHELDREDA, *St. Mary's Hospital, Brooklyn, N.Y.*

AMERICAN PROFESSIONAL PHARMACIST

JULY, 1950—"Hospital Medicine Cabinet Maintenance" by Francis X. Sturner. Describes the method in operation at the Buffalo General Hospital to maintain suitable and adequate medications on the nursing units.

page 632

"An Aid in Operating and Emergency Suites." Describes an improved lid for sterilizing jars used to keep outside surfaces of ampuls sterile when submerged in sterilizing fluid.

page 636

AUGUST, 1950—"Narcotics in Solution." Describes the procedure of preparation, the equipment necessary and the recommended method of control of narcotics in solution. Includes practical illustrations.

page 716

HOSPITAL MANAGEMENT

JUNE, 1950—"Increasing Hospital Income by Readjusting Rates," by Lawrence Brett. A rearrangement of rate structure, particularly in the matter of drug charges was necessary in this institution in order to sustain its services. The approach toward the rearrangement is described.

page 18

"Pharmacy-Nursing Teamwork Improves Care of Patient" by Lucy D. Germain, R.N., M.A. Cooperation of two essential services centered toward better patient care is possible and most successful according to the author's plan of action.

page 78

JULY, 1950—"May 1950 Regional How's Business Report." A table compiled by the Research Committee of the American Association of Hospital Accountants and *Hospital Management.* The pharmacy expense according to the department itself and "per patient day" is included in this analysis of the cross section of the nation.

page 10

"Streptomycin—White Hope in Modern TB Therapy" by Charles E. Duchess, M.D. The first of two articles on the use of Streptomycin with PAS in the treatment of tuberculosis.

page 78

AUGUST, 1950—"Establishing a Hospital Formulary in the Hospital Pharmacy," by Anna D. Thiel, chief pharmacist, Jackson Memorial Hospital, Miami, Florida. Presents the steps in the procedure of preparing a hospital formulary with emphasis on the position of an active therapeutics committee in this effort.

page 74

"Streptomycin—White Hope in Modern TB Therapy." A conclusion of the article started in the July issue.

page 78

SEPTEMBER, 1950—"New Central Supply at Peter Bent Brigham." Hospital pharmacists' interest in this setup in the position of the sterile solutions preparation in relation to the department. A flow chart for the job analysis of a lay helper in the solutions department is presented.

page 36

"What the Hospital Pharmacist Expects of the Hospital Administrator," by William Slabodnick, chief pharmacist, Massillon City Hospital, Massillon, Ohio. The author presents his experience in setting up a pharmacy in a hospital and the understanding and cooperation he received from the administration which made possible the production of a very fine trim, convenient, and well organized department.

page 94

MODERN HOSPITAL

SEPTEMBER, 1950—"Medication Cost Study" by Robert R. Cadmus, M.D., assistant director, University Hospitals, Cleveland, Ohio. A study of the cost of using the disposable injection unit in relation to time, labor and specific drug. The research analysis was done in cooperation with the nursing staff and the pharmacy at the University Hospital in Cleveland.

page 68

"The Future of Pharmacy," by Francis M. Rudi, pharmacist, Missouri Pacific Hospital, St. Louis, Mo. Discusses the necessity of training competent personnel for hospital and clinical pharmacies in view of the possibility of the very dependence of the profession upon these fields.

page 100

"Effect of Drugs on Brain Waves," by William H. Funderburk, M.S. and C. C. Pfeiffer, M.D. Discusses electroencephalography and the action of drugs in relation to the clinical value in diagnosing epilepsies.

page 104

NEWS ITEMS

A.S.H.P. Election Results

Walter M. Frazier, chief pharmacist at Springfield City Hospital, Springfield, Ohio and a past-president of the Ohio Society has been elected president of the American Society of Hospital Pharmacists for the 1951-1952 term. Mr. Frazier is a charter member of the A.S.H.P. and served as its secretary in 1946. As past-chairman of the national Committee on Membership and Organization, he was responsible for organizing increased membership activities on a local basis throughout the nation.

The vice-president-elect, Mrs. Jane L. Rogan is chief pharmacist at Evangelical Deaconess Hospital in Detroit. She has been active in both national and local pharmaceutical organizations, having served as secretary of the Michigan Chapter and a member of national committees on various occasions. She was also a member of the faculty for the 1950 Institute on Hospital Pharmacy.

Sister Mary Raphael, treasurer-elect, is chief pharmacist at St. Vincent's Hospital in Sioux City, Ia., and has recently been elected president of the Association of Hospital Pharmacists of the Midwest. She has also served on national committees, having been active on the Committee on Membership and Organization during the past year.

The secretary of the Society is nominated by the Executive Committee and elected annually by the A.S.H.P. House of Delegates.

The membership also voted to accept the new Constitution and By-Laws as presented by a special Committee at the recent convention in Atlantic City. The new Constitution and By-Laws are printed in full in the September-October issue of THE BULLETIN.

Announcement of the election results was made made by a committee of three appointed by President Reamer. Included on the committee were Mr. Kenneth Spangler, Johns Hopkins University Hospital Pharmacy, Baltimore; Mr. Robert Statler, Veterans Administration, Pharmacy Section, Washington, D.C.; and Miss Gloria Niemeyer, secretary of the American Society of Hospital Pharmacists.

The new officers will be installed at the annual convention to be held in Buffalo, N. Y. during the week of August 26, 1951. Present officers of the A.S.H.P. who will continue to function until the 1951 convention are: president, I. Thomas Reamer, Durham, N.C.; vice-president, Grover C. Bowles, Rochester, N.Y.; secretary, Gloria Niemeyer, Washington, D.C.; and treasurer, Sister Mary Jeanette, Jamaica, N.Y.

Executive Committee Meets

A meeting of the A.S.H.P. Executive Committee was held during the annual convention of the American Hospital Association in Atlantic City, N.J., September 18-21. Committee members present included: I. Thomas Reamer, president; Grover C. Bowles, vice-president; Gloria Niemeyer, secretary; Sister Mary Etheldreda, chairman of the Committee on Minimum Standards; William Slabodnick, chairman of the Convention Committee; and Milton Skolaut, chairman of the Committee on Pharmacists in Government Service. Sister Mary Jeanette, treasurer, was unable to be present due to illness. Also present by invitation were Dr. Robert P. Fischelis, Herbert L. Flack and Dr. W. Arthur Purdum, all members of the Policy Committee of the Division of Hospital Pharmacy.

Reports were received from the officers and committee chairmen outlining the plans and objectives of the Society during the current year. It was announced that the Proposed Minimum Standard for Pharmacies in Hospitals had been approved by the American Hospital Association and there was discussion on plans for implementing the standard. There was also discussion concerning the Proposed Minimum Standard for Hospital Pharmacy Internships. Tentative plans for the 1951 Institute on Hospital Pharmacy were outlined.

A. Ph. A. Election Results

The newly elected officers of the American Pharmaceutical Association who will be installed at the annual convention to be held in Buffalo, New York, during the week of August 26, 1951 are: *President-Elect,* Don E. Francke, Ann Arbor, Michigan; *First Vice-President-Elect,* Joseph B. Burt, Lincoln Nebraska; *Second Vice-President-Elect,* John A. MacCartney, Detroit, Michigan.

Members-Elect of the Council for a term of three years are: Martin E. Adamo, Boston, Massachusetts; Glenn L. Jenkins, Lafayette, Indiana and W. Arthur Purdum, Baltimore, Maryland.

Whitney Accepts Hospital Post

Harvey A. K. Whitney has accepted a position as administrator of the Hospital Pharmacies in Wayne University and will be in charge of the Department of Pharmacy at Receiving Hospital, Detroit. He will also direct the hospital pharmacy internship training program at Wayne University.

Mr. Whitney has long been active in hospital pharmacy circles. He was formerly chief pharmacist at the University of Michigan Hospital

and was the first president of the American Society of Hospital Pharmacists. At one time Mr. Whitney was co-editor of THE BULLETIN. Recently the Michigan Society of Hospital Pharmacists established in his honor the *Harvey A. K. Whitney Lecture Award* which is given annually to a pharmacist who has made outstanding contributions to hospital pharmacy.

Reprint Available

A twelve-page reprint including the *Suggested Plans for Hospital Pharmacies* along with the *Minimum Standard* is available from the Division of Hospital Pharmacy, 2215 Constitution Ave., N.W. Washington, D.C. for fifteen cents per copy. Hospital pharmacists may be interested in securing additional copies for teaching purposes.

D. O. McClusky Elected President of Alabama Hospital Association

D. O. McClusky, administrator of Druid City Hospital in Tuscaloosa, Ala., has recently been elected president of the Alabama Hospital Association. Mr. McClusky was formerly a pharmacist and has been active in local and national pharmacy organizations.

Films Available

Hospital pharmacists interested in securing films for local chapter meetings will want to note that the following are available from E. R. Squibb & Sons, 745 Fifth Ave., New York 22, N.Y.:

Pronestyl Hydrochloride
Principles of Penicillin Therapy
Streptomycin Drugs in the Treatment of Tuberculosis
Curare in Barbiturate-Nitrous Oxide Anesthesia
"℞" A Documentary Film
Malnutrition in the Hospital Patient
Endotracheal Anesthesia
Pudental Block with Demerol and Intracaine
Curare in Acute Anterior Poliomyelitis
Pediatric Anesthesia
Modern Nutrition.

Southeastern Society Meets

In beautiful Fontana Village, N.C., the Southeastern Society of Hospital Pharmacists held their Semi-Annual Meeting, Oct. 6-8. Featured entertainment was an outdoor picnic, bingo, square dance, and tour of Fontana Dam which was enjoyed by all the group and their families and friends.

The first report was given by Mrs. Lillian Price, Chief Pharmacist, Emory University Hospital, presenting the interesting details of the "Highlights of the American Society Hospital Pharmacists Convention and House of Delegates."

Mrs. Price's report was followed by a paper prepared by Mr. Charles Barnett, Chief Pharmacist, St. Luke's Hospital, Jacksonville, Fla., who discussed a methodical program for the development of a hospital formulary. He also pointed out the savings to both the patient and the hospital.

Useful equipment for hospital pharmacies was enumerated by Albert P. Lauve, Chief Pharmacist, Mercy Hospital, New Orleans, La. Mr. Lauve emphasized that the apparatus should meet the requirments of the pharmacy in which it will be used and that careful selection is of great importance.

The above talks were followed by a discussion in which Mr. Barnett and Mr. Lauve answered questions from the floor.

In his paper on "Individual vs. Flat Rate Drug Charges," Mr. D. O. McClusky Jr., Administrator, Druid City Hospital, Tuscaloosa, Ala., emphasized that the policy and procedure for the drug charges must be given careful consideration and gave six methods of approaching this problem.

A panel discussion was led by Commander W. Paul Briggs, M.S.C., U.S.N., Washington, D.C., on "Minimum Standards for Hospital Pharmacy" with Mrs. Harry K. Woods, Chief Pharmacist, St. Mary Memorial Hospital, Knoxville, Tenn., Ernest W. Rollins, Chief Pharmacist, Baptist Hospital, Winston Salem, N.C., and Albert P. Lauve, Chief Pharmacist, Mercy Hospital, New Orleans, La.

The group was fortunate in having Don E. Francke, President-Elect of the American Pharmaceutical Association, and Director of the Division of the American Society of Hospital Pharmacists, present at the meeting. He congratulated the S.S.H.P. on their fine spirit and attendance.

President of the American Society of Hospital Pharmacists, I. Thomas Reamer, Duke Hospital, Durham, N.C., told of the fine cooperation between the A. Ph. A. and the A.S.H.P.

New officers to be installed at the next meeting are: Mrs. Lillian Price, Chief Pharmacist, Emory Hospital, Atlanta, Ga., President, Mr. Ernest Rollins, Chief Pharmacist, Baptist Hospital, Winston-Salem, N.C. Vice-President, Johnnie M. Crotwell, Chief Pharmacist, Druid City Hospital, Tuscaloosa, Ala., Secretary-Treasurer.